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[Intervention Review]

Acute tocolysis for uterine tachysystole or suspected fetal distress

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ABSTRACT

Background

Uterine tachysystole (more than 5 contractions per 10 minutes in 2 consecutive intervals) is common during labour, particularly with use of labour-stimulating agents. Tachysystole may reduce fetal oxygenation by interrupting maternal blood flow to the placenta during contractions. Reducing uterine contractions may improve placental blood flow, improving fetal oxygenation. This review aimed to evaluate the use of tocolytics to reduce or stop uterine contractions for improvement of the condition of the fetus in utero. This new review supersedes an earlier Cochrane Review on the same topic.

Objectives

To assess the effects of the use of acute tocolysis during labour for uterine tachysystole or suspected fetal distress, or both, on fetal, maternal and neonatal outcomes.

Search methods

We searched Cochrane Pregnancy and Childbirth's Trials Register, ClinicalTrials.gov and the WHO International Clinical Trials Registry Platform (ICTRP) (2 February 2018), and reference lists of retrieved studies.

Selection criteria

Randomised controlled trials (RCTs) evaluating acute tocolysis for uterine tachysystole, intrapartum fetal distress, or both.

Data collection and analysis

We used standard methods expected by Cochrane.

Main results

We included eight studies (734 women), conducted in hospital settings, predominantly in high-income countries (USA, Austria, Uruguay). Two trials were conducted in upper and lower middle-income countries (South Africa, Sri Lanka). The hospital facilities all had the capacity to perform caesarean section. Overall, the studies had a low risk of bias, except for methods to maintain blinding. All of the trials used a selective beta₂ (β_2)-adrenergic agonist in one arm, however the drug used varied, as did the comparator. Limited information was available on maternal outcomes.



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Selective B2-adrenergic agonist versus no tocolytic agent, whilst awaiting emergency delivery

There were two stillbirths, both in the no tocolytic control group (risk ratio (RR) 0.23, 95% confidence interval (CI) 0.01 to 4.55; 2 studies, 57 women; low-quality evidence). One had gross hydrocephalus and the second occurred with vaginal delivery after waiting 55 minutes for caesarean section. The decision for caesarean section delivery was an inclusion criterion in both studies so we could not assess this as an outcome under this comparison. Abnormal fetal heart trace is probably lower with tocolytic treatment (RR 0.28, 95% CI 0.08 to 0.95; 2 studies, 43 women; moderate-quality evidence). The effects on the number of babies with Apgar score below seven were uncertain (low-quality evidence).

Intravenous (IV) atosiban versus IV hexoprenaline (1 study, 26 women)

One infant in the hexoprenaline group required > 24 hours in the neonatal intensive care unit (NICU) following a forceps delivery (RR 0.33, 95% CI 0.01 to 7.50; low-quality evidence). There were no fetal or neonatal mortalities and no Apgar scores below seven. There was one caesarean delivery in the IV hexoprenaline group (RR 0.33, 95% CI 0.01 to 7.50; low-quality evidence), and one case of abnormal fetal heart score in the atosiban group (RR 3.00, 95% CI 0.13 to 67.51; very low-quality evidence).

IV fenoterol bromhydrate versus emergency delivery (1 study, 390 women)

No data were reported for perinatal death, severe morbidity or fetal or neonatal mortality. IV fenoterol probably increases the risk of caesarean delivery (RR 1.12, 95% CI 1.04 to 1.22; moderate-quality evidence). Fenoterol may have little or no effect on the risk of Apgar scores below seven (RR 1.28, 95% CI 0.35 to 4.68; low-quality evidence).

IV hexoprenaline versus no tocolytic agent, whilst awaiting emergency delivery (1 study, 37 women)

No data were reported for perinatal death or severe morbidity. There were two fetal deaths in the no tocolytic control group (RR 0.23, 95% CI 0.01 to 4.55; low-quality evidence). The rate of caesarean delivery was not reported. There were two babies with Apgar scores below seven in the control group and none in the hexoprenaline group (RR 0.24, 95% CI 0.01 to 4.57; 35 women; low-quality evidence).

Subcutaneous terbutaline versus IV magnesium sulphate (1 study, 46 women)

No data were reported for perinatal death, severe morbidity or fetal or neonatal mortality. The decision for caesarean section was an inclusion criterion, so we could not assess this. The effects on abnormal fetal heart trace are uncertain (very low-quality evidence).

Subcutaneous terbutaline with continuation of oxytocic infusion versus cessation of oxytocic infusion without tocolytic agent (1 study, 28 women)

No data were reported for perinatal death, severe morbidity or fetal or neonatal mortality. There may be little or no difference in the rates of caesarean delivery in the subcutaneous terbutaline (8/15) and control groups (4/13) (RR 1.73, 95% CI 0.68 to 4.45; low-quality evidence). There were no cases of Apgar scores below seven or abnormal fetal heart trace.

Subcutaneous terbutaline versus no tocolytic agent, whilst awaiting emergency delivery (1 study, 20 women)

No data were reported for perinatal death or severe morbidity. There were no fetal or neonatal mortalities. The decision for caesarean section was an inclusion criterion, so we could not assess this. There were two babies with Apgar scores below seven in the control group and none in the terbutaline group (RR 0.17, 95% CI 0.01 to 3.08; low-quality evidence).

IV terbutaline versus IV nitroglycerin (1 study, 110 women)

No data were reported for perinatal death or severe morbidity or fetal or neonatal mortality. There may be little or no difference in the rates of caesarean delivery between the IV terbutaline (30/57) and control groups (29/53) (RR 0.96, 95% CI 0.68 to 1.36; low-quality evidence). There were no cases of Apgar scores below seven.

Authors' conclusions

There is insufficient evidence to determine the effects of tocolytics for uterine tachysystole or suspected fetal distress during labour. The clinical significance for some of the improvements in measures of fetal well-being with tocolytics is unclear. The sample sizes were too small to detect effects on neonatal morbidity, mortality or serious adverse effects. The majority of studies are from high-income countries in facilities with access to caesarean section, which may limit the generalisability of the results to lower-resource settings, or settings where caesarean section is not available.

Further well-designed and adequately powered RCTs are required to evaluate clinically relevant indicators of maternal and neonatal morbidity and mortality.



PLAIN LANGUAGE SUMMARY

Medications for reducing contractions during labour for excessively strong/frequent contractions or where the unborn baby is thought to be distressed

What is the issue?

Excessively strong or frequent contractions can occur in any labour, though are more common when women have been given medications to start off or increase contractions. In some cases, excessive contractions can be a sign of complications such as placental abruption or obstructed labour. Excessive contractions may reduce the amount of oxygen reaching the unborn baby.

'Tocolysis' is when women are given medication to reduce the strength or frequency of contractions, or both. Tocolysis may improve blood flow and therefore improve the baby's well-being. This review aimed to evaluate the benefits and harms of tocolysis when the uterus (womb) is contracting too quickly (more than 5 contractions in 2 consecutive 10-minute periods) or when the baby is showing signs of distress during labour, as detected by monitoring its heart rate.

This new Cochrane Review supersedes an earlier Cochrane Review with the same name.

Why is this important?

Babies who are deprived of oxygen during labour can develop serious problems, including cerebral palsy, organ damage or death. When fetal monitoring suggests fetal distress, measures can be taken to improve the baby's oxygen levels. This can include the use of tocolytic medications. This may be particularly important in low-resource environments, where an emergency delivery or caesarean section may not be immediately available.

What evidence did we find?

We searched for evidence in February 2018 and found eight randomised controlled trials (involving 734 women) who had excessive uterine contractions, signs of fetal distress, or both during labour. The trials tested different comparison groups, which means that our analyses were based on data from single studies involving small numbers of women. Women were randomised to receiving a β_2 -adrenergic tocolytic drug or an alternative approach (including no tocolytic while awaiting caesarean section, stopping medications that increase contraction strength, or using a different tocolytic such as atosiban, magnesium sulphate or nitroglycerin).

We combined data from two small trials (57 women), comparing a β_2 -adrenergic tocolytic drug with no tocolytic drug. Two babies died in their mother's womb, both occurring in the group of women who did not receive a tocolytic - one had gross hydrocephalus (too much fluid in and around the brain) and the other occurred whilst the mother was waiting to have a caesarean section. The number of babies with an abnormal fetal heart rate is probably lower in the group of women who were given a tocolytic, but the effects on other measures of infant well-being were uncertain.

Very few serious side effects were found, but the studies were too small to assess uncommon adverse effects.

It is not possible to draw clear conclusions about the benefits and harms and the quality of the evidence was very low to moderate.

What does this mean?

There is not enough evidence from randomised controlled trials to determine the effects of tocolysis for women with fetal distress or excessive uterine contractions, nor to identify whether one type of tocolytic drug is safer or more effective than another.

The clinical significance for some of improvements in measures of fetal well-being with tocolytics is unclear. Generally, sample sizes were too small to detect effects on maternal or infant well-being or serious adverse effects. The majority of studies were from high-income countries in healthcare facilities with access to caesarean section, which may limit the applicability of these results to lower-resource settings, or settings where caesarean section is not available.

Further high-quality studies, involving large numbers of women, are needed. Such studies could focus on measuring clinically relevant outcomes for the mother and her baby such as death of the mother, her baby, and other measures of well-being and safety.