High-dose versus low-dose oxytocin infusion regimens for induction of labour at term

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RHL summary

Key Findings

- There were no significant differences between high- and low-dose regimens in reported outcomes, including: vaginal delivery not achieved in 24 hours, Caesarean section rates, and serious maternal or perinatal morbidity or death.
- A sensitivity analysis excluding trials at high risk of bias found a significant reduction in time interval from induction to delivery, but no change in other outcomes.

Evidence included in this review

Nine randomized controlled trials involving 2391 mothers and their newborns, conducted at facilities in Canada, USA, UK, Israel and Nigeria.

Quality assessment

All trials were evaluated as having moderate to high risk of bias.

Clinical implications

- In this review, high-dose oxytocin regimens were defined as at least 100 mU oxytocin in the first 40 minutes, with increments delivering at least 600 mU in the first two hours. Low-dose oxytocin regimens were defined as less than 100 mU oxytocin in the first 40 minutes, and increments delivering less than 600 mU total in the first two hours.
- There is no clear evidence to recommend either high- or low-dose regimen oxytocin infusion.

Further research

High quality RCTs with adequate sample size are required to address the effectiveness and adverse effects of high- versus low-dose regimens of oxytocin for induction of labour at term.

Cochrane review

Abstract

When women require induction of labour, oxytocin is the most common agent used, delivered by an intravenous infusion titrated to uterine contraction strength and frequency. There is debate over the optimum dose regimen and how it impacts on maternal and fetal outcomes, particularly induction to birth interval, mode of birth, and rates of hyperstimulation. Current induction of labour regimens include both high- and low-dose regimens and are delivered by either continuous or pulsed infusions, with both linear and non-linear incremental increases in oxytocin dose. Whilst low-dose protocols bring on contractions safely, their potentially slow induction to birth interval may increase the chance of fetal infection and chorioamnionitis. Conversely, high-dose protocols may cause undue uterine hyperstimulation and fetal distress.

To determine the effectiveness and safety of high- versus low-dose oxytocin for induction of labour at term.

We searched the Cochrane Pregnancy and Childbirth Group’s Trials Register (31 August 2014) and the reference lists of relevant papers.

Randomised controlled trials and quasi-randomised controlled trials that compared oxytocin protocol for induction of labour for women at term, where high-dose oxytocin is at least 100 mU oxytocin in the first 40 minutes, with increments delivering at least 600 mU in the first two hours, compared with low-dose oxytocin, defined as less than 100 mU oxytocin in the first 40 minutes, and increments delivering less than 600 mU total in the first two hours.

Two review authors independently assessed study eligibility, extracted data and assessed the risk of bias of included studies. Data were checked for accuracy.

We have included nine trials, involving 2391 women and their babies in this review. Trials were at a moderate to high risk of bias overall.

Results of primary outcomes revealed no significant differences in rates of vaginal delivery not achieved within 24 hours (risk ratio (RR) 0.94, 95% confidence interval (CI) 0.78 to 1.14, two trials, 1339 women) or caesarean section (RR 0.96, 95% CI 0.81 to 1.14, eight trials, 2023 women). There was no difference in serious maternal morbidity or death (RR 1.24, 95% CI 0.55 to 2.82, one trial, 523 women), and no difference in serious neonatal morbidity or perinatal death (RR 0.84, 95% CI 0.23 to 3.12, one trial, 781 infants). Finally, no trials reported on the number of women who had uterine hyperstimulation with fetal heart rate changes.

Results of secondary outcomes revealed no difference between time from induction to delivery (mean difference (MD) -0.90 hours, 95% CI -2.28 to +0.49 hours; five studies), uterine rupture (RR 3.10, 95% CI 0.50 to 19.33; three trials), epidural analgesia (RR 1.03, 95% CI 0.89 to 1.18; two trials), instrumental birth (RR 1.22, 95% CI 0.88 to 1.66; three trials), Apgar less than seven at five minutes (RR 1.25, 95% CI 0.77 to 2.01, five trials), perinatal death (RR 0.84, 95% CI 0.23 to 3.12; two trials), postpartum haemorrhage (RR 1.08, 95% CI 0.87 to 1.34; five trials), or endometritis (RR 1.35, 95% CI 0.53 to 3.43; three trials). Removal of high bias studies reveals a significant reduction of induction to delivery interval (MD -1.94 hours, 95% CI -0.99 to -2.89 hours, 489 women). A significant increase in hyperstimulation without specifying fetal
heart rate changes was found in the high-dose group (RR 1.86, 95% CI 1.55 to 2.25).

No other secondary outcomes were reported: unchanged/unfavourable cervix after 12 to 24 hours, meconium-stained liquor, neonatal intensive care unit admission, neonatal encephalopathy, disability in childhood, other maternal side-effects (nausea, vomiting, diarrhoea), maternal antibiotic use, maternal satisfaction, neonatal infection and neonatal antibiotic use.

The findings of our review do not provide evidence that high-dose oxytocin increases either vaginal delivery within 24 hours or the caesarean section rate. There is no significant decrease in induction to delivery time at meta-analysis but these results may be confounded by poor quality trials. High-dose oxytocin was shown to increase the rate of uterine hyperstimulation but the effects of this are not clear. The conclusions here are specific to the definitions used in this review. Further trials evaluating the effects of high-dose regimens of oxytocin for induction of labour should consider all important maternal and infant outcomes.

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