Amnioinfusion for meconium-stained liquor in labour

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An updated version of this systematic review has been published and can be found online at www.cochrane.org. We will soon update the below RHL summary to reflect the updated findings of the systematic review.

In settings with limited intrapartum perinatal surveillance facilities, amnioinfusion in women with moderate or thick meconium staining of the amniotic fluid could improve perinatal outcomes. However, available data are not enough to detect serious obstetric adverse effects of amnioinfusion.

RHL Commentary by Sangkomkamhang US and Lumbiganon P

1. INTRODUCTION

Meconium-stained liquor during labour affects 5%–25% of all deliveries (1). Incidence rates of the condition in developing countries seem to be higher than in developed countries (2). Meconium aspiration syndrome (MAS) in neonates is a leading cause of perinatal morbidity and mortality (3). Amnioinfusion (infusion of sterile fluid into the amniotic cavity) has been proposed as a method of diluting meconium in the amniotic fluid. The objective of this Cochrane review (4) was to assess the effects on maternal and perinatal morbidity and mortality of amnioinfusion (the infusion of physiological saline or lactated Ringer’s solution into the amniotic cavity by means of a transcervical catheter) in women with meconium-stained liquor during labour.

2. METHODS OF THE REVIEW

The authors of the review searched for clinical trials that had compared the effect of amnioinfusion for meconium-stained liquor on clinically meaningful outcomes with no or sham amnioinfusion. The primary outcomes were MAS, perinatal death or serious morbidity (post hoc) and maternal death or serious morbidity (post hoc). Subgroup analyses were planned for all outcomes. The methods used in the literature search, inclusion and exclusion criteria, evaluation of trial quality and analyses of data were conducted appropriately by the authors using the standard Cochrane methodology.

3. RESULTS OF THE REVIEW

This review includes 13 studies involving 4143 women. Subgroup analysis was conducted for studies from
settings with limited peripartum facilities and settings with standard peripartum surveillance. For settings with standard peripartum surveillance, the review found no statistically significant reduction in the primary outcomes: MAS, perinatal death, and combined outcome of perinatal death or severe morbidity. For secondary outcomes, the review found a statistically significant reduction in: caesarean section performed for fetal distress [relative risk (RR) 0.40, 95% confidence interval (CI) 0.19–0.86]; variable fetal heart rate decelerations (RR 0.67, 95% CI 0.47–0.96); cord arterial pH less than 7.20 (RR 0.62, 95% CI 0.40–0.96); meconium below the vocal cords diagnosed by laryngoscopy (RR 0.31, 95% CI 0.18–0.53); and neonatal ventilation or neonatal intensive care unit admission (RR 0.45, 95% CI 0.23–0.90). There was significant heterogeneity in the data for the outcomes. The benefits tended to be greater in the smaller studies, even when the reviewers performed a post-hoc sensitivity analysis to exclude trials with greater risk of bias.

For settings with limited peripartum facilities, two studies with 855 women were included. Newborns in the amnioinfusion group had a statistically significantly reduced risk on one of the primary outcomes: MAS (one study, RR 0.25, 95% CI 0.13–0.47). For secondary outcomes there was a statistically significant reduction in: caesarean section performed for fetal distress (RR 0.50, 95% CI 0.30–0.84); five-minute Apgar score less than seven (RR 0.36, 95% CI 0.18–0.72); neonatal ventilation or neonatal intensive care unit admission (RR 0.52, 95% CI 0.37–0.73); neonatal meconium below the vocal cords (one study, RR 0.42, 95% CI 0.21–0.83); and neonatal encephalopathy (one study, RR 0.07, 95% CI 0.01–0.56). Not blinding the participants and outcomes assessors could have introduced a bias in the provision of care between the intervention and control groups such as a decision to perform caesarean section.

Owing to lack of data, the authors were unable to evaluate serious maternal adverse effects of amnioinfusion.

4. DISCUSSION

4.1 Applicability of the results

This review concludes that, in settings with limited intrapartum perinatal surveillance facilities, amnioinfusion in women with moderate or thick meconium staining of the amniotic fluid could improve some of the perinatal outcomes. The benefits might possibly be due to dilution of meconium or relief of oligohydramnios. Two of the 13 trials in this review were conducted in academic hospital in developing countries (India, South Africa, and Zimbabwe) which had limited electronic fetal monitoring capacity and health-care providers including neonatologist. Hence, the results of the review are applicable in under-resourced settings where complications of meconium staining of the amniotic fluid are common.

4.2 Implementation of the intervention

This intervention (transcervical amnioinfusion) would require some training of health-care providers. Expensive catheters could be replaced by a nasogastric tube. The intervention should be carried out in secondary or tertiary care settings where caesarean section can be performed, if needed.

A study has suggested that antepartum oligohydramnios is associated with increased MAS (5). It is possible that the benefit of amnioinfusion seen in this review is the result of relief from oligohydramnios rather than from meconium dilution. Hence, in settings where the practice is to deliver by caesarean section in oligohydramnios and/or moderate or thick meconium staining, especially with abnormal fetal heart pattern remote from delivery, that policy may be continued.

4.3 Implication for research

Further large, well-designed multicentre randomized controlled trials with appropriate allocation concealment are needed to evaluate this intervention. Research should focus on the effects of amnioinfusion on serious rare complications as uterine rupture, cord prolapse and infection. Further research should also assess the implementation of amnioinfusion, including appropriate volume of saline or lactated Ringer’s
solution to be infused and the effect of different contexts, including route of amnioinfusion, condition of amniotic fluid, neonatologist facility and HIV women. Cost–effectiveness and women’s satisfaction with amnioinfusion should also be researched.

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References

- Wiswell TE, Tuggle JM, Turner BS. Meconium aspiration syndrome: have we made a difference? Pediatrics 1990;85:715-721.


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Home > Amnioinfusion for meconium-stained liquor in labour