Antibiotics for meconium-stained amniotic fluid in labour for preventing maternal and neonatal infections

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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.

Available evidence is insufficient to draw any conclusions regarding the efficacy or side-effects related to the administration of prophylactic antibiotics to women with meconium-stained amniotic fluid. A reduction in the clinical diagnosis of chorioamnionitis was observed in the antibiotic-treated group, but this finding is based on one study only.

RHL Commentary by Hezelgrave N, Shennan AS

1. Introduction

Meconium-stained amniotic fluid (MSAF) occurs when colonic contents of the fetus are released into the liquor surrounding the fetus. This happens during labour in 7%–22% of term deliveries. The incidence of MSAF increases with gestational age, with up to 44% of post-date pregnancies (>42 weeks completed gestation) being complicated by MSAF (1, 2).

MSAF is associated with potentially adverse neonatal outcomes, although the exact mechanism of action is not completely understood and the association should not be considered directly causal. Babies born through MSAF are at risk of developing meconium aspiration syndrome (MAS), which ranges from mild respiratory distress to severe disease and death: 5% of babies with MSAF are affected by MAS, accounting for 2% of perinatal deaths (3, 4). MSAF has also been associated with admission to neonatal intensive care unit (NICU), cerebral palsy, seizures and neonatal sepsis (5, 6, 7). Moreover, it is suggested that the presence of MSAF is associated with intrapartum chorioamnionitis (8) and postpartum endometritis (9). It is likely that the burden of neonatal morbidity and mortality associated with MSAF is higher in countries with poorer access to monitoring during labour and/or to health-care facilities to expedite delivery in the presence of fetal distress and MSAF.

Since MSAF is associated with both maternal and newborn infections, it has been suggested that antibiotics help to reduce maternal and newborn morbidity linked to MSAF. This Cochrane (10) review aimed to evaluate the efficacy and side-effects of the use of prophylactic antibiotics during labour to prevent maternal and neonatal infections associated with MSAF.
2. Methods of the review

This systematic review includes all relevant published randomized and controlled trials (excluding quasi-randomization) of prophylactic antibiotic administration during labour for women with MSAF. The authors searched the Cochrane Pregnancy and Childbirth Group's Trials Register (September 2010).

The primary outcome of interest was neonatal sepsis. Subgroup analysed by early onset neonatal sepsis (symptomatic before 72 hours of age) and late onset neonatal sepsis (symptomatic after 72 hours of age). Maternal infection (postpartum endometritis and chorioamnionitis), side-effects of treatment and drug resistance were assessed as secondary outcomes, as were neonatal morbidity and mortality prior to discharge (including admission to neonatal intensive care unit), duration of mechanical ventilation and duration of stay in intensive care unit/hospital.

Two reviewers independently matched the identified studies with the inclusion criteria. Methodological quality and the risk of bias were assessed (selection, performance attrition and reporting bias) using the specified Cochrane criteria. Only one out of four trials met the inclusion criteria, therefore pooled analysis was not performed, though the methods to do so were identified for subsequent updates.

3. Results of the review

The only included trial was a double-blind study of 120 women with MSAF during labour. The women received ampicillin-sulbactam IV or normal saline as placebo. The trial was classified as having a low risk of bias with clear allocation concealment, blinding and no withdrawal, though the review authors had no access to the protocol and so they were unable to assess the risk of selective reporting.

The trial reported no significant observed reduction (or trend) in neonatal sepsis [relative risk(RR) 1.00, 95% confidence interval (CI) 0.21–4.76]. The data were not analysed by the temporal subgroups as per the Cochrane protocol, as these were not reported in the trial.

There was, however, a significant reduction in the incidence of chorioamnionitis (diagnosed clinically) in the antibiotic-treated group (RR 0.29, 95% CI 0.10–0.82. No significant reduction in postpartum maternal endometritis (RR 0.83, 95% CI 0.39–1.79) or admission to the neonatal intensive care unit was observed. No serious adverse events were reported.

4. Discussion

4.1 Applicability of the results

As the Cochrane review authors observe, the available evidence is insufficient to draw any conclusions regarding the efficacy or side-effects related to the administration of prophylactic antibiotics to women with MSAF. Despite an observed reduction in the clinical diagnosis of chorioamnionitis in the antibiotic-treated group, these findings must be interpreted with caution despite biological evidence of plausibility, as they are based on a single study’s secondary outcome.

4.2 Implementation of the intervention

There is currently no evidence to support the routine administration of antibiotics during labour to women with MSAF. However, if antibiotic administration during labour is shown to improve MSAF-related outcomes, the intervention may be particularly suitable for introduction in low-income settings.
4.3 Implication for research

The Cochrane review authors rightly calls for further good-quality randomized controlled trials in this area to enable firm conclusions to be drawn. The authors identify important subgroup analyses, including intact versus rupture membrane, single versus combined antibiotic regimens, and the duration of use of antibiotics. It should be noted that ampicillin-sulbactam is an expensive drug, especially if it is to be given prophylactically to all women with MSAF in under-resourced settings. Hence, the efficacy and safety of an orally administered less expensive antibiotic should also be explored.

It is essential that all further studies are performed both in developed and developing countries to allow widest possible applicability, and include long-term follow up and assessment of neurodevelopment outcomes. Should the intervention be found to be beneficial, then due consideration must be given to such factors as cost, practicability, acceptability and sustainability within the varying tiers of the health system.

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References

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