Prophylactic amnioinfusion for intrapartum oligohydramnios: a meta-analysis of randomized controlled trials

Pitt C, Sanchez-Ramos L, Kaunitz A M, Gaudier F

Authors' objectives
To evaluate the effectiveness of intrapartum prophylactic amnioinfusion in pregnancies complicated by oligohydramnios.

Searching
The following sources were searched from January 1983 to December 1999: BRS online (Bibliographic Retrieval Service), MEDLINE, PubMed, Current Contents, and other databases via SilverPlatter. The MeSH terms used were 'amnioinfusion', 'oligohydramnios' and 'fetal compromise'. Bibliographies from identified studies and review articles were examined for articles published in any language. Abstracts were eligible for inclusion, whereas unpublished trials and review articles were not.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible. Validity was not used as an inclusion or exclusion criteria.

Specific interventions included in the review
Comparisons of prophylactic intrapartum amnioinfusion with no amnioinfusion were eligible. Primary studies all used protocols including initial administration of normal saline or lactated Ringer's solution, ranging from 250 to 1,000 mL and infused in 20 to 60 minutes, followed by various maintenance infusion schemes until delivery or until certain amniotic fluid index levels were reached. Amnioinfusion protocols used mainly transcervical approaches; two studies used transabdominal infusions.

Participants included in the review
Pregnant women in labour with oligohydramnios were eligible. Oligohydramnios was defined as an amniotic fluid index under 5 (most studies) or less than or equal to 10 (one study).

Outcomes assessed in the review
The primary outcome was Caesarean section rate for foetal heart rate abnormalities, including intrapartum variable decelerations. Secondary outcomes were overall Caesarean section rate, foetal acidemia at birth, foetal heart rate abnormalities during labour, Apgar scores under 7 at 5 minutes, and postpartum endometritis. Only studies with clearly documented outcome data were eligible. Acidemia at birth was defined as an umbilical artery pH of less than 7.20 (most studies) or less than 7.10 (two studies).

How were decisions on the relevance of primary studies made?
The investigators independently reviewed all the trials identified.

Assessment of study quality
The validity criteria were: adequacy of method of randomisation; blinding; methodology; inclusion and exclusion criteria; amnioinfusion protocols; definition of outcomes reported; and statistical analysis. The authors do not state how the papers were assessed for validity, or how many of the reviewers performed the validity assessment.

Data extraction
The tables presented reported the author(s) of the study, the number of women per intervention group, and the outcome. One of two authors independently extracted data using a data extraction form, and any uncertainties were
resolved after consultation with the senior author.

**Methods of synthesis**

**How were the studies combined?**

Study characteristics were summarised. The odds ratio (OR), 95% confidence interval (CI) and risk difference for each dichotomous outcome were estimated using the random-effects model of DerSimonian and Laird (see Other Publications of Related Interest no.1), and the fixed-effect model of Mantel and Haenszel (see Other Publications of Related Interest no.2). Since estimates were similar, only the fixed-effect model results were reported. Publication bias was assessed using a funnel plot and the method described by L'Abbe et al. (see Other Publications of Related Interest no.3). The number-needed-to-treat (NNT) and 95% CI were also calculated.

**How were differences between studies investigated?**

The Breslow and Day test was used to assess statistical heterogeneity (see Other Publications of Related Interest no.4). Where heterogeneity was found, further investigation was undertaken. Sensitivity analyses were conducted to examine the influence of study characteristics on the results.

**Results of the review**

Fourteen RCTs involving 1,533 women were included.

Women receiving amnioinfusion had a significantly lower rate of: Caesarean section rate, foetal heart rate abnormalities, overall Caesarean section rate, foetal acidemia at birth, foetal heart rate abnormalities during labour, and Apgar scores under 7 at 5 minutes. Postpartum endometritis rates were similar among treatment groups. Apart from acidemia at birth, studies were homogeneous for outcomes. For most outcomes, funnel plots showed no evidence of publication bias. The included studies were of high quality.

Caesarean section rate for foetal heart rate abnormalities (12 RCTs with 1,240 women): OR 0.23 (95% CI: 0.15, 0.35); heterogeneity p-value 0.44; NNT 8 (95% CI: 6, 10).

Overall Caesarean section rate (13 RCTs with 1,487 women): OR 0.52 (95% CI: 0.40, 0.68); heterogeneity p-value 0.34; NNT 11 (95% CI: 7, 18).

Foetal heart rate abnormalities during labour (9 RCTs with 1,054 women): OR 0.24 (95% CI: 0.17, 0.34); heterogeneity p-value 0.22; NNT 5 (95% CI: 4, 7).

Apgar scores under 7 minutes (11 RCTs with 1,242 women): OR 0.52 (95% CI: 0.29, 0.91); heterogeneity p-value 0.72; NNT 42 (95% CI: 21, 500).

Postpartum endometritis (7 RCTs with 1,044 women): OR 0.60 (95% CI: 0.36, 1.01); heterogeneity p-value 0.11; NNT 32 (95% CI: 16, 1000).

Foetal acidemia at birth (11 RCTs with 1,173 women): OR 0.40 (95% CI: 0.30, 0.55); heterogeneity p-value 0.002; NNT 8 (95% CI: 6, 11). After removing two studies with higher rates of acidemia in the control groups, subgroup analysis showed significant difference favouring amnioinfusion.

There were differences among studies in inclusion criteria and interventions. Subgroup analysis after the exclusion of 3 RCTs that did not quantify the degree of polyhydramnios, and 2 RCTs that used transabdominal amnioinfusion, did not alter the overall results.

**Authors' conclusions**

In the presence of oligohydramnios, prophylactic intrapartum amnioinfusion significantly improves neonatal outcome and lessens the risk of Caesarean section, without increasing the rates of postpartum endometritis.
CRD commentary
The aims were stated and the inclusion criteria were defined clearly in terms of the study design, participants, interventions and outcomes. Several relevant sources were searched and no language restrictions were applied. There was no evidence for publication bias, even though no attempt was made to include unpublished material. The information on the methods used to select studies was incomplete. Primary studies were restricted to RCTs and a validity assessment was undertaken, although the results were not reported. The methods used to extract data were described, and some relevant information on individual studies was presented in tabular format. Statistical heterogeneity was assessed for each outcome, and where evidence of heterogeneity was found, further investigation was undertaken. Sensitivity analyses were conducted to assess the influence of study characteristics on the results.

The evidence presented supports the authors' conclusions.

Implications of the review for practice and research
The authors did not state any implications for further research and practice.

Bibliographic details

PubMedID
11094242

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Amniotic Fluid; Apgar Score; Cesarean Section; Female; Heart Rate, Fetal; Humans; Infant, Newborn; Oligohydramnios /prevention & control /therapy; Pregnancy; Pregnancy Outcome; Randomized Controlled Trials as Topic

AccessionNumber
12000002191

Date bibliographic record published
28/02/2002

Date abstract record published
28/02/2002

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.