Screening for group B Streptococcus in pregnant women: a systematic review and meta-analysis

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CRD summary
The authors concluded that regardless of comparators, all analyses favoured a universal screening program for reducing perinatal infection caused by group B Streptococcus in pregnant women. The reliability of the conclusions is uncertain due to the risks of bias and chance affecting results.

Authors’ objectives
To determine the best strategy for prenatal screening of pregnant women for the prevention of perinatal infection caused by group B Streptococcus.

Searching
EMBASE, LILACS, PubMed/MEDLINE, SciELO and The Cochrane Library were searched to January 2010 for studies in any language. Some search terms were reported. ControlledTrials.com was also searched. Conference abstracts and reference lists of relevant articles were scanned for additional studies.

Study selection
Eligible studies were those that assessed screening based on maternal risk factors, universal screening or no preventive intervention for group B streptococcus in women in the last trimester of pregnancy. Studies had to report incidence of early neonatal sepsis.

Most studies compared universal screening (using cultures collected in the third trimester) compared with maternal risk factor based screening, the remaining studies compared universal screening with no preventive intervention. Studies were conducted in the USA, Australia, Italy, Austria and Switzerland, and were published from 1994 to 2006.

Two reviewers independently selected studies for inclusion. Disagreements were resolved through recourse to a third reviewer.

Assessment of study quality
Study quality was assessed using methods based on STROBE (strengthening the reporting of observational studies in epidemiology) recommendations. Studies were divided into three categories for analysis: A where 80% or more criteria were fulfilled, B for compliance between 80% and 50% of criteria and C where less than 50% compliance with criteria was established.

Two reviewers independently assessed study quality.

Data extraction
Data were extracted to enable calculation of odds ratio (OR) for dichotomous variables together with corresponding 95% confidence intervals (CI).

The authors did not state how many reviewers extracted data.

Methods of synthesis
Pooled odds ratios and 95% confidence intervals were calculated using fixed-effect and random-effect models. Statistical heterogeneity was assessed using the $X^2$ and $I^2$ statistic.

Results of the review
Eight studies (104,930 participants) were included in the review: four studies used a prospective cohort design and four studies used a retrospective cohort design. Sample sizes ranged from 2000 to 42,074. Five studies were graded A and three studies graded B using the STROBE criteria.
There was a significant reduction in the incidence of neonatal sepsis caused by group B streptococcus for universal screening compared to no screening (OR 0.43, 95% CI 0.25 to 0.73; four studies; I²=39.8%). However when grouped by study design results only remained significant for the one prospective study (OR 0.16, 95% CI 0.06 to 0.42); there were no statistically significant differences between groups for retrospective studies (OR 0.56, 95% CI 0.30 to 1.02; three studies; I²=0%).

Compared to maternal risk factor based screening, universal screening significantly reduced the incidence of neonatal sepsis (OR 0.25, 0.16 to 0.37; five studies; I²=50.6%). Results remained significant when grouped by prospective or retrospective study design.

Authors’ conclusions
Regardless of comparators, all analyses favoured a universal screening programme for reduced incidence of neonatal sepsis.

CRD commentary
The review question was clear with defined inclusion criteria. Several relevant sources were searched and some attempts were made to locate unpublished studies. Study quality was assessed and a composite grade was reported; criteria used were not fully reported which made it difficult to evaluate the bias risks in individual studies. Appropriate methods were used to reduce reviewer error and bias for study selection and quality assessment but it was unclear whether similar methods were used for data extraction.

The authors stated both fixed-effect and random-effects models were used in the meta-analyses. However, only results of the fixed-effect analyses were reported and given there was evidence of statistical heterogeneity in some analyses, reporting of random-effects models would have been more appropriate. In addition the incidence of neonatal sepsis was very low and the possibility of results due to chance could not be ruled out. Few details of the interventions or participants were provided. Studies were conducted in the USA and Europe so results may not be generalisable to other populations. Several the studies included in the analyses were retrospective in design which were liable to multiple biases.

The reliability of the conclusions is uncertain due to the risks of bias and chance affecting the results of the included study designs.

Implications of the review for practice and research
Practice: The authors stated that the strategy of universal screening for pregnant women associated with the use of prophylactic antibiotics was safe and effective as demonstrated by the reductions in the incidence of neonatal sepsis. It should be noted that prophylactic antibiotics were not explicitly evaluated in the review.

Research: The authors stated that studies were needed to evaluate the magnitude of early neonatal infection caused by group B streptococcus infection in the maintenance of mortality rate in the population. Studies should also evaluate the impact of the adoption of preventive measures in Brazil, and prevention and prophylaxis alternatives for preterm infants.

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