**CRD summary**

This review concluded that the limited available data did not show differences in effectiveness and safety outcomes between short-course and long-course antibiotic treatment for bacterial meningitis in infants and children. The authors' conclusions reflected the evidence presented. However, a degree of caution might be required in interpreting these conclusions, given methodological concerns with the review methods.

**Authors' objectives**

To assess the effectiveness and safety of short-course antibiotic therapy for the treatment of bacterial meningitis in children.

**Searching**

PubMed and Cochrane Central Register of Controlled Trials (CENTRAL) were searched up to November 2007. Reference lists of relevant publications were handsearched. Search terms were reported. Abstracts from conferences were excluded, as were studies in languages other than English, Spanish, French, German, Italian and Greek.

**Study selection**

Randomised controlled trials (RCTs) that compared a short-course antibiotic treatment (up to seven days) with a long-course treatment (at least two days longer than the corresponding short-course treatment) with the same antibiotic agents administered by the same route and in the same total daily dosage in patients of any age group with community-acquired acute bacterial meningitis were eligible for inclusion. The primary review outcome was clinical success (defined as complete recovery or substantial improvement of symptoms and signs of meningitis). Secondary outcomes were all-cause in-hospital mortality, persistence of cerebrospinal fluid abnormalities, duration of hospitalisation, total adverse events, patient withdrawals due to adverse events, secondary nosocomial infections, long-term hearing impairment and long-term neurological complications.

All included trials evaluated intravenous ceftriaxone and determined clinical outcomes at the end of therapy. More than half of the included trials excluded patients with specific characteristics of increased risk. Duration of short-course therapy varied from four to seven days; duration of long-course therapy varied from seven to 14 days. Where reported, one trial did not use concomitant therapy. One trial permitted additional therapy with intravenous dexamethasone. The included studies were conducted in Europe, North America, Latin America and Asia. The age of included patients varied between three weeks and 16 years.

The authors stated neither how the papers were selected for the review nor how many reviewers performed the selection.

**Assessment of study quality**

Study quality was assessed using the Jadad scale (a 5-point scale evaluating randomisation, blinding, withdrawal and allocation concealment). Studies scoring at least 3 were classed as high quality.

The authors did not state how many reviewers performed the validity assessment.

**Data extraction**

For dichotomous outcomes, data were extracted on the number of events for intervention and control groups to enable calculation of odds ratios (ORs) with 95% confidence intervals (CIs). For continuous outcomes, data were extracted on the mean and standard deviation (SD) in each group to enable calculation of mean differences (MDs) with 95% CIs.
The authors did not state how many reviewers performed the data extraction.

Methods of synthesis
The studies were combined in meta-analyses. For dichotomous outcomes, pooled ORs with 95% CIs were calculated. For continuous outcomes, weighted mean differences (WMDs) with 95% CIs were calculated. Statistical heterogeneity was assessed using the X² test. The DerSimonian and Laird random-effects model was used if there was significant heterogeneity, otherwise the Mantel-Haenszel fixed-effect model was employed. A post-hoc sensitivity analysis was conducted to assess the impact of study quality on the primary outcome. Publication bias was visualised using funnel plots.

Results of the review
Five RCTs were included in the meta-analyses (n=426). Sample size varied from 52 to 119. All the trials had an open-label study design. Three RCTs were judged as high quality. The timing of the late follow-up assessment varied between included trials and ranged from day of discharge to six months after discharge.

Compared with long-course antibiotic therapy, short-course antibiotic therapy had no significant difference in end-of-therapy clinical success (OR 1.24, 95% CI 0.73 to 2.11; five RCTs, n=383). Short-course antibiotic therapy was associated with a significant shorter duration of hospitalisation (WMD -2.17 days, 95% CI -3.85 to -0.50; two RCTs, n=137).

There were no significant differences in the outcomes of long-term neurological complications, long-term hearing impairment, total adverse events and secondary nosocomial infections between the two groups.

No significant heterogeneity was observed for the outcomes of end-of-therapy clinical success, long-term neurological complications and long-term hearing impairment. Sensitivity analysis did not materially affect the results. Results of statistical heterogeneity assessment for other outcomes were not presented. Results of publication bias assessment were not reported.

Authors' conclusions
The limited available data did not show differences in the effectiveness and safety outcomes between short-course and long-course antibiotic treatment for bacterial meningitis in infants and children.

CRD commentary
This review's inclusion criteria were clear. Relevant databases were searched. The decision to exclude unpublished studies from conference proceedings may have increased the possibility of publication bias. Although many languages were considered, some popular languages were excluded and the possibility of language bias can not be ruled out. It was unclear whether sufficient attempts were taken to minimise errors and bias in the review process. Relevant criteria were used to assess the study quality. Statistical heterogeneity was assessed and appropriate methods were used to pool the results. The authors' conclusions reflected the evidence presented. However, a degree of caution might be required in interpreting these conclusions, given the potential methodological concerns outlined above.

Implications of the review for practice and research
Practice: The authors stated that children without adverse prognostic factors and who showed a rapid initial clinical recovery could be considered as candidates for an early discontinuation of antibiotic treatment for bacterial meningitis.

Research: The authors stated that further studies on shortened antibiotic therapy for bacterial meningitis in appropriately selected patients were required.

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