Management of acute otitis media: update


CRD summary

The authors concluded that immediate antibiotic therapy was more effective than placebo for treating uncomplicated acute otitis media. Comparison of different antibiotic treatments was inconclusive for recurrent otitis media. Further research is needed. The authors’ conclusions reflected the evidence, but given significant heterogeneity and concerns regarding the analysis, their conclusions should be interpreted with caution.

Authors' objectives

To update a 2001 review to assess the effectiveness of different treatments for uncomplicated acute otitis media in average risk children and children with recurrent or persistent acute otitis media.

Searching

PubMed, Cochrane Central Register of Controlled Trials (CENTRAL) and DARE were searched between 1998 and July 2010 without language restrictions. Search terms were reported. Web of Science was searched for relevant proceedings and Science Citation Index was searched for articles that cited the 2001 review (see Other Publications of Related Interest) and its peer-reviewed publications. References of relevant systematic reviews and included articles were searched manually. Experts in the field were contacted.

Study selection

Randomised or controlled clinical trials and large observational studies that compared the effectiveness of different treatments for uncomplicated acute otitis media (as defined in the review) in average risk children and children with recurrent or persistent acute otitis media (as defined in the review) were eligible for inclusion. Treatment comparisons could include antibiotics versus wait and see approach, analgesics or placebo, comparisons of various antibiotics, high-versus low-dose treatment and short- versus long-term treatment. Eligible studies were required to report on treatment failure, invasive infections, bacteriologic cure, disease recurrence, quality of life or functional outcome and parent satisfaction.

Included studies were published between 1967 and 2010 and were of children aged between two months and less than 15 years. Treatment success was reported between two and 20 days. Treatment doses and regimens differed between studies.

Two reviewers independently screened studies for inclusion. Discrepancies were resolved by consensus or through referral to a third reviewer.

Assessment of study quality

Randomised controlled studies (RCTs) were assessed on quality using the five-point Jadad scale of randomisation, double blinding and description of withdrawals/dropouts. Cohort studies were assessed using the criteria: clear definition of the study cohort, early inception point, clear pathway of patient entry, complete follow-up, description of dropouts, objective outcome criteria, outcome assessor blinding and adjustment for extraneous factors.

Two reviewers independently assessed study quality. Discrepancies were resolved through discussion.

Data extraction

Two reviewers independently extracted data on success rates to calculate absolute rate differences and their 95% confidence intervals (CIs). Adverse events were extracted. Discrepancies were resolved through discussion or referral to a third reviewer.

Methods of synthesis

Where three or more studies reported on the same comparisons, a random-effects model was used to pool absolute rate differences and their 95% CIs, weighted by the inverse of the variance. Otherwise, findings were reported narratively.
The number needed to treat (NNT) was calculated.

The $X^2$ test and $I^2$ statistic were used to assess statistical heterogeneity. Sensitivity analysis was undertaken by removal of low-quality studies (score <3) and by exclusion of outliers.

Publication bias was assessed with funnel plots and the Egger's test.

**Results of the review**

Comparative effectiveness of different treatments for uncomplicated acute otitis media in average risk children:

Ampicillin or amoxicillin versus placebo (seven studies, n=2,058; four scored more than 3 on quality): Clinical success rates by day 14 were significantly higher in patients who received ampicillin or amoxicillin compared to placebo (rate difference 12%, 95% CI 5% to 18%, NNT=9), but there was evidence of statistical heterogeneity ($I^2=68.9\%$). Sensitivity analysis with removal of one outlier study did not significantly alter the results. Analysis that included only studies with a quality score of at least three resulted in no statistically significant difference in success rate between treatment groups (rate difference 6%, 95% CI -1% to 13%; four studies).

There were no statistically significant differences in success rate at day 14 for ampicillin or amoxicillin versus ceftriaxone (four studies, n=518; two scored >3 on quality, $I^2=50.7\%$), amoxicillin-clavulanate versus azithromycin (nine studies, n=1,826; two scored >3 on quality, $I^2=79.9\%$, sensitivity analyses did not significantly alter the results) and cefaclor versus azithromycin (three studies, n=427, one scored 3 on quality, $I^2=0\%$).

There were no statistically significant differences in success rate at day 16 for amoxicillin-clavulanate versus ceftriaxone (five studies, n=1,362; one scored >3 on quality, $I^2=22.9\%$).

Findings for antibiotics versus wait and see/prescription to hold were mixed (four studies).

There was no evidence of publication bias for any comparisons. Results for comparisons that included only one study were reported in the review.

Comparative effectiveness of different treatments for recurrent (uncomplicated), persistent, or relapsing otitis media:

Five studies compared antibiotic treatments for recurrent otitis media or persistent acute otitis media in children. None showed a significant advantage for any particular treatment.

Seven studies compared antibiotic or non-surgical treatments and six studies compared surgical versus surgical or non-surgical treatments to prevent acute otitis media in children with recurrent otitis media. None showed a significant difference between treatments.

**Adverse events:** Most comparisons for treatment of uncomplicated otitis media or treatment or prevention of acute otitis media in children with recurrent otitis media or persistent acute otitis media reported equivalence for adverse events or inconclusive findings. Of note, diarrhoea was significantly higher in patients treated with amoxicillin-clavulanate compared to cefdinir, ceftriaxone and ciprofloxacin-dexamethasone ear drops (one study each). Other adverse events were reported.

**Authors' conclusions**

Immediate antibiotic therapy was more effective than placebo for treating uncomplicated acute otitis media and comparison of different antibiotic treatments was inconclusive in children with recurrent otitis media. There were limitations with the included studies and further higher quality research was needed. Clinicians should weigh up the risks (including possible long term effects on antibiotic resistance) and benefits before prescribing immediate antibiotics for uncomplicated acute otitis media.

**CRD commentary**

The review question was clear and supported by appropriate inclusion criteria. A satisfactory search of the literature was undertaken and included unpublished data and data in any language. Formal assessment showed no evidence of publication bias. The authors undertook each stage of the review process in duplicate, which reduced potential for
reviewer error and bias. Appropriate criteria were used to assess study quality and most scored low on quality. Few patient characteristics were reported in the review and so it was difficult to determine the comparability of participants at baseline. There was evidence of significant heterogeneity for some comparisons; the authors acknowledged differences between study definitions for clinical success and acute otitis media and differences in study time periods. Inclusion criteria varied widely and adverse events were reported differently across studies. Pooling of the studies may not have been appropriate. A number of comparisons were assessed in only one or two studies, which limited the generalisability of these findings, and comparisons for some outcomes were inconclusive.

The authors' conclusions seemed to reflect the evidence and highlight limitations of the included studies, but given the heterogeneity among studies and concerns with pooling of the results, the conclusions should be interpreted with some degree of caution.

**Implications of the review for practice and research**

**Practice:** The authors stated that the usefulness of the findings to clinicians was unknown due to concerns regarding internal validity of some of the studies and the generalisability because of a lack of standardisation across studies.

**Research:** The authors stated that higher quality studies were needed. Future studies should use standard definitions and terminology to allow greater synthesis and generalisability of the findings.

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http://www.ahrq.gov/clinic/tp/otitisuptp.htm

**Other publications of related interest**


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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.