A comparison of the effectiveness of pharmacologic treatment of otitis media with effusion in children: integrative and meta-analysis

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Authors' objectives
To compare the effectiveness of pharmacological treatment versus placebo in otitis media with effusion in children.

Searching
Searches were conducted of the following using the keywords ‘otitis media with effusion’: MEDLINE (including Avicenna) and CINAHL (1980 to 1997); and the Internet using the search engines Yahoo (first 60 out of 8,050 hits were reviewed) and Infoseek (first 50 out of over 12,000,000 hits were reviewed). Reference lists of 12 articles obtained from 32 abstracts were examined. Reviews were excluded for the meta-analysis.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) focusing on otitis media with effusion in children were included if outcome was assessed using pneumatic otoscopy and tympanometry and meta-statistics were reported. Studies were excluded if they were published before 1980, published in foreign journals, were unpublished papers, dissertations or theses.

Specific interventions included in the review
The following therapies were studied: antibiotic plus decongestant plus antihistamine; antibiotic plus decongestant; decongestant plus antihistamine; decongestant; and placebo. Amoxycillin was given in doses of 40 mg/kg/day, 40 mg/kg 3 times/day and 250 mg three times/day for between 10 and 14 days. Decongestants included: oral pseudoephedrine 1mg/kg 4 times/day; cyclical nasal instillation of 25% phenylephidine for 4 weeks with days with 0 drops to days with 12 drops; and nasal instillation of xylometazoline 0.5% 2 to 3 drops for 10 days. Antihistamine was oral chlorpheniramine maleate in dose of 0.09 mg/kg 4 times/day for 4 weeks. Placebo preparations were oral suspensions and nasal drops that paralleled the concomitant pharmacological treatment in taste, colour, odour and consistency. Pharmacological and placebo treatments were administered for between 10 and 28 days.

Participants included in the review
Children aged from 3 months to 12 years with otitis media with effusion (OME) were studied.

Outcomes assessed in the review
Cure of OME as evidenced by pneumatic otoscopy and tympanometry was assessed.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
The following validity criteria were assessed: justification for study; conceptual framework; stated problem/purpose; critical review of issues; hypothesis/study question; theoretical definitions; operational definitions; design described; control of validity; sufficient sample size; representative sample; data collection; instrument validity; instrument reliability; statistical treatment; data presentation; results related to problems; discussion related; conclusions logically derived; recommendations made; and alternative explanations. Validity criteria were assessed by two independent researchers and consensus reached. Each criteria was scored as follows: 1 = low; 2 = medium; 3 = high; 0 = absent; NA = not applicable. Mean validity scores were calculated for each study. The NA score was not used in calculating the mean score.
Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

Methods of synthesis
How were the studies combined?
The computer program Meta Tech (see Other Publications of Related Interest) was used to calculate the P value of effect size weighted by sample size. The number needed to treat (NNT) was estimated.

How were differences between studies investigated?
The authors do not state how differences between the studies were investigated.

Results of the review
5 RCTs, including 4 double-blind trials with 1686 children, were included (total of 1765 children).

Number of trials and children assessing specified therapies was as follows:
- Antibiotic plus decongestant plus antihistamine vs placebo (2 RCTs, 992 children).
- Antibiotic plus decongestant vs placebo (1 RCT, 141 children).
- Decongestant plus antihistamine vs placebo (1 RCT, 556 children).
- Decongestant vs placebo (1 RCT, 79 children).

Mean validity scores for the 5 trials included in the meta-analysis ranged from 2.55 to 2.85 out of a maximum possible score of 3.

1705 children completed the trials out of the 1765 children entered. However, it was also reported that 208 children did not complete the study and that 121 were excluded due to illness, giving overall drop-out rate of 18.6%.

Overall 44% of those treated pharmacologically had total cure of OME at 4 weeks compared to 36% of the placebo group. Pooled effect size was weak (correlation coefficient \( R = 0.07, P = 0.0017 \)). Mean NNT = 45.278 (range 3.27 to 200).

Other statistics of effect size included \( d, t, r, F, x, z \) and \( n \). However no explanation of these terms was given, thus these results are not reported.

Authors' conclusions
Pharmacological treatment of children with otitis media and effusions resulted in significantly greater resolution than placebo. However, the effect size was weak.

CRD commentary
The aims and inclusion criteria were stated. Validity was assessed and the method used to assess validity was described. By limiting the search to published articles in non-foreign journals that reported meta-statistics some other relevant studies may have been omitted. The term ‘foreign journals’ was not defined. No details were given of methods used to select primary studies or extract data. It is not clear whether validity assessment included adequacy of method of randomisation and baseline comparability of treatment groups. Figures for numbers completing trials were inconsistent. Drop-out rates from individual trials were not reported by treatment arm so it is not clear if acute illness or drop-outs were more frequent in the placebo arms. It is not clear whether the analysis was by intention to treat. All studies using antibiotics used amoxycillin but no mention is made of how children sensitive to this drug were treated in the individual trials. No comment was made on potential inter-rater variability in the diagnosis of otitis media with effusion and its
resolution. Results from trials were pooled without any assessment of heterogeneity. Fuller details of methods used to calculate effect size and definition of the statistics used would have been helpful. It is not clear why effect size rather than odds ratios or relative risk was used to calculate summary results.

Given the above limitations, the authors conclusions cannot be considered supported by the evidence presented.

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

**Practice:** The authors consider that clinicians have to weigh side effects of pharmacological treatment against weak treatment effect and report that findings from the review support advising a period of watchful waiting rather than initiating pharmacological treatment in children with otitis media with effusion for a minimum of 6 weeks and maximum of 3 months. At that time referral for further evaluation is recommended.

**Research:** The authors consider that future research should focus on factors that inhibit spontaneous resolution of otitis media with effusion.

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**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.