Nebulized magnesium sulfate in the management of acute exacerbations of asthma

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CRD summary
This review concluded that there was insufficient evidence to determine the role of nebulised magnesium sulphate in the treatment of acute exacerbations of asthma. The review had methodological limitations (limited search and no validity assessment) and only six small studies were included. However, the authors' cautious conclusions, and their recommendation for further research, appear appropriate.

Authors' objectives
To evaluate the efficacy and safety of nebulised magnesium sulphate (NMS) for treating acute exacerbations of asthma.

Searching
MEDLINE/PubMed and EMBASE were searched to October 2005; the search terms were reported. The searches were restricted to publications in the English language. Abstracts were excluded. The reference lists of retrieved articles were checked for additional studies.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion in the review.

Specific interventions included in the review
Studies of NMS were eligible for inclusion. The included studies compared NMS versus albuterol; albuterol plus NMS versus albuterol plus placebo; and NMS versus placebo. In some studies all patients received additional treatments such as hydrocortisone, albuterol, prednisolone or methylprednisolone. The dose of NMS ranged from 16 to 384 mg.

Participants included in the review
Studies of patients with asthma were eligible for inclusion. Most included studies were of adults, but one was of children and adolescents (aged 5 to 17 years) and one included both children and adults. The participants in some studies were reported to have reduced peak expiratory flow rate (PEFR) or forced expiratory volume in 1 second, or to have moderate to severe asthma.

Outcomes assessed in the review
The studies were required to evaluate efficacy or safety end points. The efficacy outcomes included pulmonary function, clinical disease severity and rate of hospitalisation. The safety end points were as described by the individual trials.

How were decisions on the relevance of primary studies made?
Two independent reviewers evaluated studies for relevance. The authors did not state how any disagreements were resolved.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Two reviewers independently extracted the data.
Methods of synthesis
How were the studies combined?
The studies were described and discussed in a narrative.

How were differences between studies investigated?
Some differences between the studies were discussed in the text and tables.

Results of the review
Six RCTs (n=282) were included.

Based on one study, NMS alone did not show any benefit over albuterol alone in terms of improved pulmonary function (PEFR and Fischl index). A study comparing NMS with placebo, in which all patients received albuterol, also showed no significant differences between the groups. Four studies comparing albuterol plus NMS with albuterol plus placebo gave inconsistent results. One study found a significantly lower rate of hospitalisation in the albuterol plus NMS group compared with the albuterol plus placebo group.

Authors' conclusions
There was insufficient evidence to determine the role of NMS in the treatment of acute exacerbations of asthma.

CRD commentary
This review addressed a clear research question using defined inclusion criteria. The authors searched only two databases and reference lists, so it was possible that relevant studies could have been missed. The review was restricted to English language publications and unpublished studies were not sought, which raises the possibility of language and publication bias. The study selection and data extraction were undertaken by two reviewers independently, thus reducing the risk of bias and errors during the review process. The validity of the included studies was not assessed, which makes it difficult to assess the reliability of the results and the reviewers' synthesis. Adequate details of the primary studies were presented. The use of a narrative summary and discussion was appropriate in view of the heterogeneity of the included studies in terms of populations and comparators. Given the limitations of the evidence and the methodological weaknesses of the review, the authors' cautious conclusions, and their recommendation for further research, appear appropriate.

Implications of the review for practice and research
Practice: The authors stated that the therapeutic use of NMS could not be recommended.

Research: The authors stated that a trial comparing NMS with placebo in patients receiving appropriate doses of beta2-agonists, anticholinergics and systemic corticosteroids is warranted. The study should evaluate pulmonary function, time to disposition, rate of hospitalisation and adverse events, and should be powered to evaluate mild, moderate and severe exacerbations.

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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.