Review: Magnesium sulfate is effective for severe acute asthma treated in the emergency department


Question
What is the effectiveness of intravenous magnesium sulfate in patients with acute asthma who were treated in the emergency department?

Data sources
Studies were identified from the Cochrane Airways Review Group Register, MEDLINE, EMBASE/Excerpta Medica, CINAHL, and the Cochrane Library; hand searches of 20 high-quality respiratory journals; bibliographies of relevant papers; and contact with authors and content experts.

Study selection
Studies were selected if they were randomized controlled trials or quasi-randomized trials, included adults or children presenting to an emergency department with acute asthma, and compared intravenous magnesium sulfate with placebo.

Data extraction
Data were extracted on study and patient characteristics, hospital admissions, pulmonary function, vital signs, and adverse events.

Main results
27 studies were reviewed for inclusion, and 7 trials (665 patients; 5 of adult and 2 of pediatric patients; 6 from the United States and 1 from India) met the inclusion criteria. Analyses of all patients and of patients with severe asthma showed a reduction in hospital admission rates (Table), whereas no difference was shown for patients with mild-to-moderate asthma. Studies that included all patients showed no differences in measures of pulmonary function (peak expiratory flow rate or FEV	extsubscript{1}) or vital signs (heart rate, respiratory rate, or blood pressure). In studies of patients with severe asthma, peak expiratory flow rate improved by 52 L/min (95% CI 27 to 78 L/min; 3 studies) and FEV	extsubscript{1} by 8% of the predicted value (CI 5% to 12%; 3 studies). Data were insufficient to assess adverse events.

Conclusion
Intravenous magnesium sulfate reduces the rate of hospital admissions and improves pulmonary function in patients with severe acute asthma treated in the emergency department.

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For correspondence: Dr. B.H. Rowe, Division of Emergency Medicine, University of Alberta, 1111 Walter Mackenzie Centre, 8440-112 Street, Edmonton, Alberta T6G 2B7, Canada. FAX 403-492-9857.

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Magnesium sulfate vs placebo for hospital admissions among patients with acute asthma at end of study*

<table>
<thead>
<tr>
<th>Patients</th>
<th>Weighted event rates</th>
<th>RRR (95% CI)</th>
<th>NNT (CI)</th>
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<tbody>
<tr>
<td></td>
<td>Magnesium sulfate</td>
<td>Placebo</td>
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</tr>
<tr>
<td>All</td>
<td>23%</td>
<td>45%</td>
<td>30% (2 to 49)</td>
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<tr>
<td>Severe asthma</td>
<td>51%</td>
<td>91%</td>
<td>44% (29 to 56)</td>
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*Abbreviations defined in Glossary; RRR, NNT, and CI calculated from data in article.

References