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[Intervention Review]

# Magnesium sulfate for treating exacerbations of acute asthma in the emergency department

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## ABSTRACT

### Background

Treatment of acute asthma is based on rapid reversal of bronchospasm and arresting airway inflammation. There is some evidence that intravenous magnesium can provide additional bronchodilation when given in conjunction with standard bronchodilating agents and corticosteroids. No systematic review of this literature has been completed on this topic.

### Objectives

To examine the effect of additional intravenous magnesium sulfate in patients with acute asthma managed in the emergency department.

### Search methods

Randomised controlled trials were identified from the Cochrane Airways Review Group register. Bibliographies from included studies, known reviews and texts were searched. Primary authors and content experts were contacted.

### Selection criteria

Randomised controlled trials or quasi-randomised trials were eligible for inclusion. Studies were included if patients presented with acute asthma and were treated with IV magnesium sulfate versus placebo.

### Data collection and analysis

Data were extracted and methodological quality was assessed independently by two reviewers. Missing data were obtained from authors.

### Main results

Seven trials were included (5 adult, 2 pediatric). A total of 665 patients were involved. Patients receiving magnesium sulfate demonstrated non-significant improvements in peak expiratory flow rates when all studies were pooled (weighted mean difference: 29.4 L/min; 95% confidence interval: -3.4 to 62). In studies of people with severe acute asthma, peak expiratory flow rate improved by 52.3 L/min (95% confidence interval: 27 to 77.5). The forced expiratory volume in one second also improved by 9.8 % predicted (95% confidence interval: 3.8 to 15.8). Overall, admission to hospital was not reduced, odds ratio: 0.31 (95% confidence interval: 0.09 to 1.02). In the severe subgroup, admissions were reduced in those receiving magnesium sulfate (odds ratio: 0.10, 95% confidence interval: 0.04 to 0.27). No clinically important changes in vital signs or adverse side effects were reported.

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**Authors' conclusions**

Current evidence does not support routine use of intravenous magnesium sulfate in all patients with acute asthma presenting to the emergency department. Magnesium sulfate appears to be safe and beneficial in patients who present with severe acute asthma.

**PLAIN LANGUAGE SUMMARY****Magnesium sulfate for treating exacerbations of acute asthma in the emergency department**

In an asthma attack, the airways (passages to the lungs) narrow from muscle spasms and swelling (inflammation). Bronchodilator drugs (reliever inhalers) can be used to relax the muscles and open the airways, and corticosteroid drugs to reduce the inflammation. Magnesium sulfate is a drug that can also affect muscles, and may reduce inflammation as well. It can be given through a drip in the veins (intravenously). The review of trials found that intravenous magnesium sulfate in addition to bronchodilators seems to be safe and beneficial for people with severe asthma attacks, or those for whom bronchodilators are not working.