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Intravenous and Nebulized Magnesium Sulfate for Treating Acute Asthma in Children: A Systematic Review and Meta-Analysis

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Abstract

Objective: This study aimed to evaluate the efficacy of intravenous (IV) and nebulized magnesium sulfate in acute asthma in children.

Methods: The PubMed, Cochrane Library, and EMBASE databases were searched. Randomized controlled trials and quasi-randomized controlled trials of IV and nebulized magnesium sulfate in pediatric acute asthma were included. The outcomes subject to meta-analysis were pulmonary function, hospitalization, and further treatment. If statistical heterogeneity was significant, random-effects models were used for meta-analysis, otherwise, fixed-effects models were applied.

Results: Ten randomized and quasi-randomized trials (6 IV, 4 nebulized) were identified. Intravenous magnesium sulfate treatment is associated with significant effects on respiratory function (standardized mean difference, 1.94; 95% confidence interval [CI], 0.80-3.08; $P = 0.0008$) and hospital admission (risk ratio, 0.55; 95% CI, 0.31-0.95; $P = 0.03$). But nebulized magnesium sulfate treatment shows no significant effect on respiratory function (standardized mean difference, 0.19; 95% CI, -0.01-0.40; $P = 0.07$) or hospital admission (risk ratio, 1.11; 95% CI, 0.86-1.44; $P = 0.42$).

Conclusions: The meta-analysis revealed that IV magnesium sulfate is an effective treatment in children, with the pulmonary function significantly improved and hospitalization and further treatment decreased. But nebulized magnesium sulfate treatment showed no significant effect on respiratory function or hospital admission and further treatment.

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