

Paramedic – Evidence Based Medicine (P-EBP) Program

Paramedic CAT (Critically Appraised Topic) Worksheet

Title: The effectiveness of giving magnesium sulfate as an adjunct medication in COPD exacerbated patients

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Clinical Scenario:

A patient is presenting with COPD exacerbation and after receiving primary bronchodilators nebulized (Ventolin and Atrovent) – COPD protocol., the patient does not appear to improve and is in severe respiratory distress. Is magnesium sulfate effective for relief of shortness of breath with COPD exacerbation and will it improve the patient's overall distress and lung function?

PICO (Population – Intervention – Comparison – Outcome) Question:

Patients presenting with COPD exacerbation, after giving initial bronchodilators, will magnesium sulfate lead to improved patient condition or changes in vital signs and lung function?

Search Strategy:

In PubMed: (COPD exacerbation OR COPD) (MeSH) AND (magnesium sulfate)

Search Outcome:

This search yielded 6 different “hits”. Two papers were relevant to this PICO question.



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Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
(Mukerji, 2015)	30 COPD exacerbation patients presenting to the ER received IV magnesium sulfate after primary bronchodilators	Prospective and PEP LOE: 3	-Percentage change in FEV1 and FVC at TO, T60 & T120. -Admission rates, length of stay and requirement for NIV or mechanical ventilation	-95%ci 3.7 to 27.7, p=0.01 -admission: p=0.8 & length of stay: p=0.11 & NIV: p=0.3 -They found that magnesium sulfate causes the bronchodilators to work more effectively thereby improving patient outcome.	This was an okay study and I trust it, but it wasn't as specific as I was hoping for. -small sample size, not generalized to EMS setting only in the ER -patients were specific and it was randomized which was good
(Skorodin, 1995)	72 COPD acute exacerbations presented to the ER received 1.2 g of magnesium sulfate or placebo over 20 minutes after receiving albuterol	Prospective and PEP LOE: 1	-Demographic and clinical characteristics of patients receiving magnesium sulfate or placebo	-(25.1 \pm 35.7 L/min vs 7.4 \pm 33.3L/min; P=.03) -There was a trend toward a reduced need for hospitalization compared with placebo group	-Very old study. The results were very confusing.

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Comments: It appears that magnesium sulfate is safe to give but does not seem to impact the patient that greatly, other than enhancing the effects of the initial bronchodilators.

Consider: I would not change my practice to give magnesium sulfate, as there is not enough evidence it will improve the patient's outcome. There may be better options such as corticosteroids.

Clinical Bottom Line: Magnesium sulfate is a safe drug to give and may be an effective drug to administer, but it is currently not in our local protocols for COPD exacerbation and I would have to call OLMC if I considered it an appropriate treatment after using our protocols in place first.

References:

Mukerji, S., Shahpuri, B., Clayton-Smith, B., Smith, N., Armstrong, P., Hardy, M...March, E. (2015). Intravenous magnesium sulphate as an adjuvant therapy in acute exacerbations of chronic obstructive pulmonary disease: a single centre, randomized, double-blinded, parallel group, placebo-controlled trial: a pilot study. Retrieved from <https://rpa.hollandcollege.com:2052/pubmed/26905985>

Skorodin, MS., Tenholder, MF., Yetter, B., Owen, KA., Waller, RF., Khandelwahl, S...D'Alfonso, N. (1995). Magnesium sulfate in exacerbations of chronic obstructive pulmonary disease. Retrieved from <https://rpa.hollandcollege.com:2052/pubmed/7864705>

