



TITLE: Medication Administration via Metered Dose Inhalers and Aerochambers Versus Nebulizers For Adult Patients: Clinical Effectiveness

DATE: 13 November 2013

RESEARCH QUESTION

What is the comparative effectiveness of medication administration via metered dose inhalers (MDI) and aerochambers versus nebulizers for adult patients in health care settings?

KEY MESSAGE

Two systematic reviews, two RCTs, and two non-randomized studies were identified regarding the comparative effectiveness of medication administration via metered dose inhalers and aerochambers versus nebulizers for adult patients in health care settings.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2013, Issue 10), University of York Centre for Reviews and Dissemination (CRD), ECRI (Health Devices Gold) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. The search was also limited to English language documents published between Jan 1, 2008 and Nov 4, 2013. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials (RCTs), non-randomized studies, economic evaluations, and evidence-based guidelines.

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Two systematic reviews, two RCTs, and two non-randomized studies were identified regarding the comparative effectiveness of medication administration via metered dose inhalers (MDI) and aerochambers versus nebulizers for adult patients in health care settings. No relevant health technology assessments were identified. Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

One systematic review¹ compared the effectiveness of beta-agonist delivery via MDIs with an aerochamber with nebulizers for the treatment of acute asthma. Six of the 39 trials included in the review involved inpatients and there were more children included in the analysis than adults. For adults, the length of stay, peak flow, and expiratory volume were all similar between the two methods and the authors concluded there was no significant difference between the two delivery methods.

One systematic review² compared MDIs and nebulizers for the delivery of aerosol bronchodilators for mechanically ventilated adults in critical care. Limitations of the data meant meta-analysis could not be undertaken and the authors concluded that there was not sufficient evidence to support either delivery method. One RCT³ compared salmeterol and fluticasone delivered via a MDI with spacer with ipratropium, terbutaline, and budesonide via nebulizer for mechanically ventilated patients with chronic obstructive pulmonary disease (COPD). No significant differences in minute ventilation, expiratory pressure, or airway resistance were observed between groups.

One crossover RCT⁴ compared intermediate dose ipratropium and salbutamol via MDI with spacer and high dose ipratropium and salbutamol via nebulizer for patients with COPD. There were no significant differences in clinical outcomes reported between the two methods. The authors suggested stepping up the intermediate dose via MDI before moving on to nebulized therapy. One non-randomized study⁶ examined lung deposition of salbutamol via MDI with spacer or nebulizer following an acute exacerbation of COPD or asthma and found no significant differences in urinary salbutamol excretion or forced expiratory volume between the two delivery methods.

A non-randomized crossover study⁵ examined the effects of bronchodilator therapy via MDI or nebulizer on inspiratory lung function parameters. Lung function parameters improved significantly following treatment with both devices. The authors concluded that the MDI with spacer was a better method of administration than the nebulizer for patients with stable COPD.

REFERENCES SUMMARIZED

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

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Randomized Controlled Trials

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Non-Randomized Studies

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APPENDIX – FURTHER INFORMATION:

Non-Randomized Studies – before and after

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Guidelines and Recommendations

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See: Delivery systems used to treat patients with stable COPD, page 20

Review Articles

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