Holding chambers (spacers) versus nebulisers for beta-agonist treatment of acute asthma

Christopher J Cates¹, Jacqueline A Crilly², Brian H Rowe³

¹Community Health Sciences, St George's, University of London, London, UK. ²St James' Hospital, Leeds, UK. ³Department of Emergency Medicine, University of Alberta, Edmonton, Canada

Contact address: Christopher J Cates, Community Health Sciences, St George's, University of London, Cranmer Terrace, London, SW17 0RE, UK. ccates@sgul.ac.uk .

Editorial group: Cochrane Airways Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 1, 2009.
Review content assessed as up-to-date: 21 July 2008.

Citation: Cates CJ, Crilly JA, Rowe BH. Holding chambers (spacers) versus nebulisers for beta-agonist treatment of acute asthma. Cochrane Database of Systematic Reviews 2006, Issue 2. Art. No.: CD000052. DOI: 10.1002/14651858.CD000052.pub2.

Copyright © 2009 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

ABSTRACT

Background
In acute asthma inhaled β2-agonists are often administered to relieve bronchospasm by wet nebulisation, but some have argued that metered-dose inhalers with a holding chamber (spacer) can be equally effective. Nebulisers require a power source and need regular maintenance, and are more expensive in the community setting.

Objectives
To assess the effects of holding chambers (spacers) compared to nebulisers for the delivery of β2-agonists for acute asthma.

Search strategy
We searched the Cochrane Airways Group Trial Register and reference lists of articles. We contacted the authors of studies to identify additional trials. Date of last search: January 2008.

Selection criteria
Randomised trials in adults and children (from two years of age) with asthma, where spacer β2-agonist delivery was compared with wet nebulisation.

Data collection and analysis
Two reviewers independently applied study inclusion criteria (one reviewer for the first version of the review), extracted the data and assessed trial quality. Missing data were obtained from the authors or estimated. Results are reported with 95% confidence intervals (CI).

Main results
This review has been updated in January 2008 and two new trials have been added. 2295 children and 614 adults are now included in 27 trials from emergency room and community settings. In addition, six trials on in-patients with acute asthma (213 children and 28 adults) have been reviewed. Method of delivery of β2-agonist did not appear to affect hospital admission rates. In adults, the relative risk of admission for spacer versus nebuliser was 0.97 (95% CI 0.63 to 1.49). The relative risk for children was 0.72 (95% CI: 0.47 to 1.09). In children, length of stay in the emergency department was significantly shorter when the spacer was used, with a mean...
difference of -0.53 hours (95% CI: -0.62 to -0.44 hours). Length of stay in the emergency department for adults was similar for the two delivery methods. Peak flow and forced expiratory volume were also similar for the two delivery methods. Pulse rate was lower for spacer in children, mean difference -6.27% baseline (95% CI: -8.29 to -4.25% baseline).

**Authors’ conclusions**

Metered-dose inhalers with spacer produced outcomes that were at least equivalent to nebuliser delivery. Spacers may have some advantages compared to nebulisers for children with acute asthma.

**PLAIN LANGUAGE SUMMARY**

**Holding chambers (spacers) versus nebulisers for beta-agonist treatment of acute asthma**

In acute asthma attacks higher doses of inhaled \( \beta_2 \)-agonists (reliever inhalers) are used to overcome the narrowing of the passages in the lungs. The medication can be given by wet nebulisation or from an inhaler with a spacer device (holding chamber). This review now includes in-patient studies, as well as those in casualty and community setting, comparing these two delivery methods in acute asthma attacks. In adults, no important differences were found between the two methods, whilst in children those randomised to wet nebulisation spent longer in casualty. Metered-dose inhalers with a spacer can perform at least as well as wet nebulisation in delivering \( \beta_2 \)-agonists in acute asthma.