

Think Twice About Nebulizers for Asthma Attacks

MDIs with spacers are as effective as nebulizers for delivering β -agonists and less likely to cause adverse effects.

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PRACTICE CHANGER

Stop ordering nebulizers to deliver β -agonists to patients older than 2 who have mild or moderate asthma exacerbations. A metered-dose inhaler (MDI) with a spacer produces the same benefits with fewer adverse effects.¹

STRENGTH OF RECOMMENDATION

A: Based on an updated Cochrane meta-analysis of 39 randomized controlled trials (RCTs).¹

ILLUSTRATIVE CASE

A 6-year-old girl with a history of reactive airway disease comes to your office complaining of cough and wheezing. On exam, she has mild retractions, a respiratory rate of 35 breaths/min, and an O_2 saturation of 96% on room air. Her lung fields are diffusely wheezy. Her parents would like to keep her out of the hospital. How should you order her albuterol to decrease her wheezing and minimize adverse effects?

Asthma affects nearly 19 million adults and 7 million children in the United States.² Asthma exacerbations are the third most common reason for hospitalization in children.^{2,3} Treatment usu-

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ally requires multiple agents, including inhaled β -agonists. These are most effective when delivered to the peripheral airways, which is a challenge during an asthma exacerbation because of airway swelling and rapid breathing. Two devices have been developed to effectively deliver medication to the peripheral airways: nebulizers and MDIs with a holding chamber (spacer).¹

Several studies have demonstrated that for mild to moderate asthma exacerbations, administering a β -agonist via an MDI with a spacer is as effective as using a nebulizer.^{4,5} Asthma treatment guidelines also state that spacers are either comparable or preferable to nebulizers for β -agonist administration in children and adults.^{6,7} However, based on our experience, clinicians still frequently order nebulizer treatments for patients with asthma exacerbations, despite several advantages of MDIs with spacers. Notably, they cost less and don't require maintenance or a power source. Clinicians administered nebulizer therapy at more than 3.6 million emergency department (ED) visits in 2006.⁸

In this latest Cochrane review, Cates et al¹ added four new studies to those included in their earlier Cochrane meta-analysis and evaluated what, if any, effect these



studies had on our understanding of nebulizers versus MDIs with spacers.

STUDY SUMMARY

Outcomes with nebulizers are no better than those with spacers

This systematic review and meta-analysis pooled the results of RCTs comparing spacers to nebulizers for administering β -agonists during acute, non-life-threatening asthma exacerbations.¹ The authors reviewed studies conducted in EDs, hospitals, and outpatient settings that included children and adults. The primary outcomes were hospital admission rates and duration of hospital stay. Secondary outcomes included time spent in the ED, change in pulse rate, and incidence of tremor.

Cates et al¹ analyzed 39 trials that included 1,897 children and 729 adults and were conducted primarily in an ED or outpatient setting. The four new studies added 295 children and 58

adults to the researchers' earlier meta-analysis. Studies involving adults and children were pooled separately. Most patients received multiple treatments with β -agonists titrated to the individual's response.

No differences in hospitalizations. Rates of hospital admissions did not differ between patients receiving β -agonists via a spacer compared to a nebulizer in both adults (relative risk [RR] = 0.94) and children (RR = 0.71). Duration of hospital stay did not differ between the two delivery methods in adults (mean difference [MD] = -0.60 d) and children (MD = 0.33 d).

For kids, spacers meant less time in the ED. Duration in the ED was approximately half an hour shorter for children using spacers (MD = -33.48 min). There was no difference observed in adults (MD = 1.75 min). The rate of tremor was lower in children using spacers (RR = 0.64) and was similar in adults (RR = 1.12). The rise in pulse rate was lower in children using spacers (MD = -5.41% change from baseline) and was similar in adults (MD = -1.23%).

WHAT'S NEW

Additional evidence that spacers are as effective as nebulizers

This meta-analysis, which included four new studies, should finally dispel the myth that nebulizers deliver β -agonists more ef-

fectively than MDIs with spacers. Additionally, in children, spacers are associated with lower rates of adverse effects, including tremor and elevated pulse rate.

CAVEATS

Most studies involving children were open label

Although most of the adult trials in this meta-analysis involved a double-dummy design, which allows for effective participant blinding, most of the studies involving children were open label. This open-label design might have been a source of reporting bias for symptom-related outcomes but should not have affected hospital admission rates or duration of hospital stay.

In the double-dummy studies, adults received both a nebulizer and a spacer, which likely explains the similar time spent in the ED by the treatment and control groups.

CHALLENGES

TO IMPLEMENTATION

Old habits are hard to break

Clinicians may think that patients view nebulizers as more potent or more effective than spacers and thus be more likely to order them. Some patients may prefer nebulizers because of convenience or other factors. **CR**

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