Date published/posted 1/18/2011

Clinical Question

P (population/problem)  Among pediatric patients with wheezing
I (Intervention)              does the use of nebulizer with oxygen
C (Comparison)              vs. the use of air nebulizer for delivery of medication
O (Outcome)                   increase the improvement of respiratory symptoms as measured by respiratory score?

Target Population: Pediatric patients with wheezing 0 to 18 years of age.

Recommendation

There was insufficient evidence and lack of consensus to make a recommendation on the use of air or oxygen to deliver nebulized medication for pediatric patients who are wheezing or have asthma.

Cincinnati Children’s Hospital policy Respiratory care Policy II 204 Oxygen Therapy. Last reviewed 12/19/08.

Discussion/summary of evidence

The literature search did not uncover a clear answer as to whether oxygen or air should be used to deliver nebulized medication to pediatric asthma patients. The evidence found studied only adults and the use of oxygen with asthma, emphysema, and/or COPD (Ballester 1989 [4b], Chien 2000 [4a] Gunawardena 1984 [4b], Rodrigo 2003 [2a], Ting 2004 [5a]). One study of the use of oxygen with nebulized medication among children was inconclusive (Gleeson 1988 [2b]). One study assessed the performance of different commercial nebulizers (Reisner 2001 [4a]). But none of the articles directly addressed oxygen as being a more effective delivery device over air nebulization. The strength of the body of evidence is low.

Health Benefits, Side Effects and Risks There were no health benefits or risks concluded.

References/Citations


Note: Full tables of evidence grading system available in separate document:

- [Table of Evidence Levels of Individual Studies by Domain, Study Design, & Quality](#) (abbreviated table below)
- [Grading a Body of Evidence to Answer a Clinical Question](#)
- [Judging the Strength of a Recommendation](#) (abbreviated table below)

<table>
<thead>
<tr>
<th>Table of Evidence Levels (see note above)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quality level</strong></td>
</tr>
<tr>
<td>1a† or 1b†</td>
</tr>
<tr>
<td>2a or 2b</td>
</tr>
<tr>
<td>3a or 3b</td>
</tr>
<tr>
<td>4a or 4b</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

†a = good quality study; b = lesser quality study

<table>
<thead>
<tr>
<th>Table of Recommendation Strength (see note above)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strength</strong></td>
</tr>
<tr>
<td>“Strongly recommended”</td>
</tr>
<tr>
<td>“Recommended”</td>
</tr>
<tr>
<td>No recommendation made</td>
</tr>
</tbody>
</table>

**Dimensions:** In determining the strength of a recommendation, the development group makes a considered judgment in a consensus process that incorporates critically appraised evidence, clinical experience, and other dimensions as listed below.

1. Grade of the Body of Evidence (see note above)
2. Safety / Harm
3. Health benefit to patient (*direct benefit*)
4. Burden to patient of adherence to recommendation (*cost, hassle, discomfort, pain, motivation, ability to adhere, time*)
5. Cost-effectiveness to healthcare system (*balance of cost / savings of resources, staff time, and supplies based on published studies or onsite analysis*)
6. Directness (*the extent to which the body of evidence directly answers the clinical question [population/problem, intervention, comparison, outcome]*)
7. Impact on morbidity/mortality or quality of life

---

**Supporting information**

**Introductory/background information**
The use of nebulization in the outpatient setting is not standardized in terms of oxygen or air being the most appropriate method of delivery.

**Group/team members:**

*Team Leader: Tricia Luckhaupt, RNII, CPN*

*Support personnel:* Lisa English Long, MSN, RN, CNS, Evidence based Mentor and Barbara K. Giambra, MS, RN, CPNP, Evidence based Practice Mentor, Center for Professional Excellence/Research and Evidence based Practice
Search strategy
Databases searched: OVID MEDLINE, EBSCO CINAHL, PUBMED, SCOPUS, and GOOGLE SCHOLAR
Search Terms: Oxygen/air nebulizer, respiratory treatments, nebulizer/air, oxygen/albuterol, nebulizer therapy, asthma/therapy, asthma, oxygen
Filters: English language
Date range: All dates up to and including 4/2010

Copies of this Best Evidence Statement (BEST) are available online and may be distributed by any organization for the global purpose of improving child health outcomes. Website address: http://www.cincinnatichildrens.org/svc/alpha/h/health-policy/ev-based/default.htm Examples of approved uses of the BEST include the following:

- copies may be provided to anyone involved in the organization’s process for developing and implementing evidence based care;
- hyperlinks to the CCHMC website may be placed on the organization’s website;
- the BEST may be adopted or adapted for use within the organization, provided that CCHMC receives appropriate attribution on all written or electronic documents; and
- copies may be provided to patients and the clinicians who manage their care.

Notification of CCHMC at HPCEInfo@cchmc.org for any BEST adopted, adapted, implemented or hyperlinked by the organization is appreciated.

For more information about CCHMC Best Evidence Statements and the development process, contact the office at: 513-636-2501 or HPCEInfo@cchmc.org.

Additionally, for more information about CCHMC Best Evidence Statements and the development process, contact the Center for Professional Excellence/Research and Evidence based Practice office at CPE-EBP-Group@cchmc.org for the contact information.

Note
This Best Evidence Statement addresses only key points of care for the target population; it is not intended to be a comprehensive practice guideline. These recommendations result from review of literature and practices current at the time of their formulation. This Best Evidence Statement does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. This document is not intended to impose standards of care preventing selective variances from the recommendations to meet the specific and unique requirements of individual patients. Adherence to this Statement is voluntary. The clinician in light of the individual circumstances presented by the patient must make the ultimate judgment regarding the priority of any specific procedure.

Reviewed against quality criteria by 2 independent reviewers