Purpose of Study

Background:
• Breath actuated nebulizers have improved asthma care in adults.
• Children’s Hospital and Research Center at Oakland - reduced clinical asthma scores (CAS), hospitalization rates, and respiratory rates with AoeroEclipse II Breath Actuated Nebulizer (BAN).

Objective:
To determine if albuterol delivery via BAN vs. conventional continuous nebulizer optimizes care and reduces cost in pediatric patients treated for wheeze/asthma in the MUSC Pediatric Emergency Department.

Methods/Design

• Convenience sample of patients 1-18 years, with wheeze/asthma from May-November 2008.
• Patients received ALB via BAN (2.5mg if 5-10kg, 5mg if 10-20kg, 7.5mg if >20kg) or CNB (10mg or 15mg)
• Patients unable to actuate BAN were converted to cont ALB delivery.

Results

Average 1st Dose of Albuterol Used in Patients Treated by Asthma Severity and Treatment Group

<table>
<thead>
<tr>
<th>Asthma Category</th>
<th>BAN +/- SEM</th>
<th>CNB +/- SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>MILD</td>
<td>6.1</td>
<td>3%</td>
</tr>
<tr>
<td>MODERATE</td>
<td>3.7</td>
<td>13%</td>
</tr>
<tr>
<td>SEVERE</td>
<td>7.6</td>
<td>50%</td>
</tr>
</tbody>
</table>

AVERAGE LOS, IN MINUTES, FOR PATIENTS DISCHARGED FROM THE ER, BY ASTHMA CATEGORY AND TREATMENT GROUP

<table>
<thead>
<tr>
<th>Asthma Category</th>
<th>BAN +/- SEM</th>
<th>CNB +/- SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>MILD</td>
<td>124.8</td>
<td>137.3</td>
</tr>
<tr>
<td>MODERATE</td>
<td>7.6</td>
<td>50%</td>
</tr>
<tr>
<td>SEVERE</td>
<td>31.3</td>
<td>30%</td>
</tr>
</tbody>
</table>

Average CAS, by Treatment Group & CAS Category, PRE and POST 1ST DOSE ALBUTEROL

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>BAN</th>
<th>CNB</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE</td>
<td>5.8</td>
<td>5.4</td>
</tr>
<tr>
<td>POST</td>
<td>1.6</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Comparison of means

Stratified by CAS: MILD (CAS 0-2), MOD (CAS 3-6), SEVERE (CAS 7-10).

Comparison of means

Comparison of means

Conclusions

• Greater first response, significant & ~50% lower CAS after 1st treatment in MOD exacerbation, despite fewer patients on inhaled controller therapy.
• Fewer hospitalizations, ~50% fewer admits for MOD.
• Shorter LOS, significant in MOD and SEVERE groups.
• BAN treated patients spent ~1/3 less time in PED (54-72 min shorter LOS).
• Decreased wait time for PED care with more rapid room turn over.
• Improved delivery, less waste.
• Decreased ambient loss of medication: BAN ~4% vs. ~30% with CNB.
• Reusable device can be used for up to 1 week in hospital or home.
• Moderate group used 50% less albuterol per treatment compared to CNB group.
• Cost savings to hospital - Est $118K labor savings, incl cost of device, by cutting each treatment by 5 minutes.

Impact, Education & Goals

• Multidisciplinary approach was critical to device implementation and adoption.
• Cost savings resulted in implementation in the PED, the Children’s Hospital, and the MUSC adult hospital system.
• Reduce treatment time on wards, better utilization of RT time.
• Reducing PICU admissions.
• By reducing severity of patient transferred from the ED,
• Shorter treatments allow more severe asthmatics to be floor managed.
• In-service seminars target learning needs of residents & nursing staff.
• Access to RTs, skilled in use of device, to demonstrate and answer questions concerning device use has eased transition.
• Video presentation, demonstrating proper use, is being developed to aid RTs in educating patients and their parents.
• Implementation of video and handouts will aid parents to assist in treatment administration, saving critical RT time, and further reducing cost.