Change in Use of Continuous Albuterol After Implementation of RT-driven Asthma Weaning Protocol

Jacob Kaslow, MD, Sara Multerer, MD, Michelle Stevenson, MD, MS
Department of Pediatrics, University of Louisville School of Medicine

Background
Our center began using continuous albuterol nebulization therapy (CNT) on the general inpatient ward in 2009, and this practice has been commonplace since that time. In Sept 2015, a respiratory therapist driven asthma weaning protocol was instituted on the general medicine floors. However, we have not yet assessed the effect of this practice on frequency of CNT use, intensive care admissions and length of stay across cohorts from time periods in each of those practices of management.

Objectives
To compare the following before and after the initiation of the RT-driven protocol:
• Time on CNT albuterol
• Length of stay (LOS) of children with status asthmaticus (SA)
• Frequency of ICU admission

Materials and Methods
• Single site, retrospective cohort review of children aged 2 – 17 years admitted with a diagnosis of SA
• Records were divided into two cohorts:
  • Those admitted from July 2010 to June 2011
  • Those admitted from April 2016 to March 2017
  • Data from a similar cohort from Jun 2007-2008 was included for comparison
• Exclusion criteria:
  • Hemodynamically significant congenital heart disease
  • Significant underlying pulmonary disease (i.e. cystic fibrosis)
  • Home ventilator patients
• Abstracted data:
  • Demographics
  • Overall LOS
  • Length of time on CNT
  • ICU LOS
  • Initial admission location

<table>
<thead>
<tr>
<th></th>
<th>2010-2011 Cohort</th>
<th>2016-2017 Cohort</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Admission to ICU</td>
<td>100 (14.5%)</td>
<td>76 (16.3%)</td>
<td>?? ??</td>
</tr>
<tr>
<td>Any ICU Stay</td>
<td>140 (20.2%)</td>
<td>93 (20%)</td>
<td>?? ??</td>
</tr>
<tr>
<td>CNT Utilization</td>
<td>14.5 Hours</td>
<td>7.02 Hours</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Median Length of Stay</td>
<td>57 Hours</td>
<td>37.4 Hours</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Results
• Of those patients with no ICU admission, median length of stay in 2010-2011 was 57.00 hrs compared to 37.43 hours in 2016-2017 (p<0.001)
• Similarly, there is a significant difference in the time on CNT between 2010-2011 and 2016-2017 (14.5 hrs vs 7.02 hrs, p<0.001).
• There is no statistical difference between the percentage of patients transferred to the ICU from the med/surg units (20.2% vs. 20%).
• Similarly, there is no significant difference between the 2010-2011 and 2016-2017 cohorts with any ICU admission in terms of median LOS, median time on CNT or median ICU.

Discussion
• The availability of CNT albuterol outside of the ICU instituted after the 2007-2008 data and the increase in 2010-2011 is thought to be secondary to simple availability. This can explain the large increase in time on CNT in patients transferred to ICU in 2010-2011.
• The dramatic decrease in median LOS and time on CNT between 2010-2011 and 2016-2017 in patients on the med/surg unit can presumably be attributed to the standardization of asthma scores and more frequent evaluations.
• Median LOS on the med/surg unit across all three cohorts shows continued decrease suggesting improved utilization of CNT for status asthmatics admissions.
• It is difficult to account for the large difference in number of asthma patients being admitted (2010-2011: 692 vs 2016-2017: 466). This may be secondary to improved emergency department practices, decrease in number of exacerbations or change in acuity, although there are similar percentages with any ICU admission in both cohorts.
• The reason for the increasing LOS for patients with any ICU admission is not currently known and warrants further investigation.
• Due to the lack of asthma score usage in the 2010-2011 cohort, this study cannot determine whether the higher usage is due to over-utilization of CNT versus an increase in asthma severity and acuity.

Acknowledgments
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