Predicting Admission of Children Presenting to the Emergency Department with Acute Asthma

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Introduction

• Asthma is the most prevalent chronic illness of childhood.
• Acute asthma exacerbation is the most common complication.
• In Saudi Arabia, an average of 5.7% of all ED visits were secondary to acute asthma (1)
• Severity can be assessed by using a clinical score, like Pediatric Asthma Score (PSA)
## Pediatric Asthma Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>1 point</th>
<th>2 points</th>
<th>3 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory rate (breaths/min)</td>
<td>2-3 years: $\leq 34$</td>
<td>35-39</td>
<td>$\geq 40$</td>
</tr>
<tr>
<td></td>
<td>4-5 years: $\leq 30$</td>
<td>31-35</td>
<td>$\geq 36$</td>
</tr>
<tr>
<td></td>
<td>6-12 years: $\leq 26$</td>
<td>27-30</td>
<td>$\geq 31$</td>
</tr>
<tr>
<td></td>
<td>$\geq 12$ years: $\leq 23$</td>
<td>24-27</td>
<td>$\geq 28$</td>
</tr>
<tr>
<td>Oxygen saturation (%)</td>
<td>$&gt;95$ with room air</td>
<td>90-95 with room air</td>
<td>$&lt;90$ with room air or supplemental oxygen</td>
</tr>
<tr>
<td>Auscultation</td>
<td>Normal breathing or end-expiratory wheezing</td>
<td>Expiratory wheezing</td>
<td>Inspiratory and expiratory wheezing, diminished breath sounds, or both</td>
</tr>
<tr>
<td>Retractions</td>
<td>None or intercostal</td>
<td>Intercostal and substernal</td>
<td>Intercostal, substernal, and supraclavicular</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>Speaks in sentences or coos and babbles</td>
<td>Speaks in partial sentences or utters short cries</td>
<td>Speaks in single words or short phrases or grunts</td>
</tr>
</tbody>
</table>
Objectives

• Primary:
  - To evaluate the utility of PSA and its components in predicting hospital admission for children presenting to ER with moderate to severe acute asthma exacerbation

• Secondary:
  - to evaluate the seasonal variation of acute asthma presentation in children
Methods

- From November 2010 to March 2012
- Children 2–12 years of age who are presenting to the ED with acute asthma exacerbation were screened using the PAS at:
  - Baseline
  - 1st hour
  - 2nd hour
  - 3rd hour
  - 4th hour
- Patients can be discharged earlier if they fit discharge criteria
- Patients who were critically ill, had heart or chronic lung disease, or received systemic steroids within the past 7 days were excluded from the study, as well as patients with mild asthma
Methods

• Statistical Analysis: Receiver operator characteristic (ROC) curves were drawn to assess prediction of admission of PAS and each of its components (AUC) at (BL, 1h, 2h, 3h, 2h-BL)
Results

• 906 visits by children with moderate-to-severe acute asthma were made to the ED.
• 157 admissions
Figure 2: Receiver operator characteristic curves of the acute asthma scores at (a) baseline, (b) 1\textsuperscript{st} h, (c) 2\textsuperscript{nd} h, (d) 3\textsuperscript{rd} h, and (e) the difference in score between the 2\textsuperscript{nd} h and baseline. RR: Respiratory rate; OS: Oxygen saturation.
Figure 1: Frequency chart showing the distribution of admitted and discharged children with acute asthma and their ratio from the emergency department over 1 year.
Discussion

• The small difference in the AUC between the 2\textsuperscript{nd} and 3\textsuperscript{rd} h suggests that more patients could possibly be admitted earlier at the 2\textsuperscript{nd} h.
• PRAM score also showed improvement in predictability of admission with time (2)
• Many asthma scoring systems lack OS and RR. (3), (4), (5)
Conclusion and Message

• Admitting more children with acute asthma earlier based on their asthma score, especially when ED beds are on very high demand, could save a lot of valuable time and money.

• There is a great need to have a standardized acute asthma severity score that includes all the important clinical determinants of acute asthma and gives each one an appropriate weight.
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References:


Thank You

Full Article in (www.thoracicmedicine.org)
https://goo.gl/dGvWT9