Decreasing Time to Broad Spectrum Antibiotics for Septic Patients in the Emergency Department

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Background

- Typical host response
- Dysregulated host response
- Infection
- Infection resolves
- Sepsis
- Severe Sepsis
- Septic Shock

Methods

- Create tool to identify potentially septic patients
- Implement electronic medical record (EMR) pharmacist alert
- Educate physicians, nurses, and pharmacists

Two or more modified SIRS criteria plus either a lactate or blood culture ordered

<table>
<thead>
<tr>
<th>Modified SIRS Criteria</th>
<th>Parameters</th>
</tr>
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<tbody>
<tr>
<td>Heart Rate</td>
<td>&gt; 90 bpm</td>
</tr>
<tr>
<td>Respirations</td>
<td>&gt; 20 rpm</td>
</tr>
<tr>
<td>Temperature</td>
<td>&lt; 36°C or &gt; 38.3°C</td>
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<tr>
<td>White Blood Cells</td>
<td>&lt; 4,000/mm³ or &gt; 12,000/mm³</td>
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Pharmacist Response to Electronic Alert

Summarized Pharmacist Workflow

- Review patient profile (culture history, allergies, tolerances)
- Assess and/or recommend antibiotic agents and dose
- Encourage efficient administration of antibiotics

Results

- Median Time from ED admission to antibiotics
  - Pre-alert (n = 65)
  - Post-alert (n = 74)
  - Wilcoxon two-sample test: p = 0.33

- Antibiotics Within One and Three Hours of Admission
  - Antibiotics (%) within 3 hours: p = 0.68
  - Antibiotics (%) within 1 hour: p = 0.49

Conclusions

- Electronic alerts sent to the pharmacist decreased the median time to antibiotic administration for septic patients in the ED
- Electronic alerts sent to the pharmacist increased the percentage of septic patients that received antibiotics within one hour
- Electronic alerts sent to the pharmacist increased the percentage of septic patients that received antibiotics within three hours
- None of the findings were statically significant

Future Direction

- Evaluate alert criteria to improve positive predictive value
- Consider creation of EMR workflow to easily track care of septic patients
- Evaluate mortality benefit of implementing this intervention
- Consider creation of similar alerts for other goal-driven disease states with recommended treatment algorithms

Limitations

- Small sample size may have limited ability to find statistical significance
- Alert fired frequently on patients that were not determined to have severe sepsis or septic shock
- CMS criteria for determining severe sepsis and septic shock are based on the definitions prior to 2016

References