Sepsis Squashing Squadron: Hospital-Wide Floor Sepsis Identification, Treatment, and Expediency

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Background

- Sepsis is the leading cause of death in hospitals in the United States with 1 in 3 deaths being from septic shock¹
- Early recognition and administration of antibiotics are the best predictors of improved mortality¹
- Sepsis response teams (SRT) is one method to improve sepsis identification, treatment compliance to guidelines, and reduce hospital mortality²
- To improve sepsis care on general hospital floors, our hospital created a “Sepsis Squashing Squadron” — a combination of SRT and automated scoring tools in EHR targeted at improving:
  - Sensitivity of Sepsis Detection
  - Specificity of Sepsis Detection
  - Efficiency/Response Times
  - Guideline Compliance
- This implementation was our largest to date and included a hospital-wide effort to identify trends and improve identification/response times

Methods

- Through daily chart review, a Sepsis Squashing Squadron (S3) team member screened hospital medicine patients on an assigned floor unit
- Automated scores available in Epic were recorded for performance characterization: qSOFA, an institutional modification of the Modified Early Warning score (jMEWS), sepsis score (SS) and Epic’s “deterioration index” (DI)
- S3 members used Epic automated score thresholds which previously had been shown to have a sensitivity/specificity of >93%/>50%:
  - jMEWS ≥ 2
  - DI ≥ 30 and/or SOFA ≥ 2
- For patients with a likely and/or definitive infection and a SIRS ≥2, adherence to Severe Sepsis/Septic Shock Early Management Bundle (SEP-1) components were assessed

Results

- From 4/19/23 - 5/31/23, 2453 patients screened across 13 units
- Daily Sepsis Prevalence was 274/2,453
- New Episode of Sepsis 163/274
- Of 163 with new sepsis, SEP-1 Bundle Adherence:
  - Antibiotics 99/163 (60.7%)
  - Blood Cultures 89/163 (54.6%)
  - Lactate Draw 61/163 (37.4%)
  - IV Fluids 49/163 (30.1%)
- Of the 163 new sepsis patients, 107 were adjudicated for appropriate recognition and treatment
- Appropriate Recognition & Treatment: 37/107 (34.5%)
- Updated Automated Epic Score Thresholds, AUC, and Sensitivity | Specificity with Lower Limit Specificity ≥ 0.2:

<table>
<thead>
<tr>
<th>Score</th>
<th>Threshold</th>
<th>Sensitivity</th>
<th>Specificity ≥ 0.2</th>
<th>AUC</th>
</tr>
</thead>
<tbody>
<tr>
<td>jMEWS</td>
<td>≥6; Sen/Spec 0.53</td>
<td>0.25</td>
<td></td>
<td>(AUC - 0.79)</td>
</tr>
<tr>
<td>SS</td>
<td>≥4; Sen/Spec 0.67</td>
<td>0.21</td>
<td></td>
<td>(AUC - 0.78)</td>
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<tr>
<td>DI</td>
<td>≥46; Sen/Spec 0.42</td>
<td>0.20</td>
<td></td>
<td>(AUC - 0.69)</td>
</tr>
<tr>
<td>mSOFA</td>
<td>≥5; Sen/Spec 0.04</td>
<td>0.4</td>
<td></td>
<td>(AUC - 0.60)</td>
</tr>
</tbody>
</table>

Conclusion

- Complete SEP-1 bundle adherence and appropriate recognition/treatment was low
- Low adherence and lengthy time from order to action provides room for improvement
- Sepsis scores for recognition are wanting with AUCs ranging from 0.6-0.79 and poor sensitivities, even with specificity minimums of 0.2

References