Emergency Department Pharmacist Led Methicillin Resistant Staphylococcus Aureus Polymerase Chain Reaction Assay for Vancomycin in Pneumonia

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Background

- Antimicrobial regimen for methicillin-resistant Staphylococcus aureus (MRSA) coverage with antibiotics such as vancomycin are recommended for empiric use in the treatment of suspected MRSA (1-2).
- Nasal MRSA Polymerase Chain Reaction (PCR) assay has shown high negative predictive value for MRSA pneumonia.
- Previous retrospective studies in the inpatient setting have demonstrated no difference in hospital mortality or decreased exposure to broad-spectrum antimicrobials (vancomycin) with MRSA PCR utilization for de-escalation of therapy (3-5).
- Early utilization of MRSA PCR by pharmacists in the ED will lead to early de-escalation or avoidance of vancomycin in patients with suspected pneumonia and MRSA risk factors.

Objectives

Utilize MRSA PCR assay by pharmacist in the ED for early de-escalation or avoidance of vancomycin in patients with suspected pneumonia and MRSA risk factors.

Methods

Design:
Single center, retrospective cohort study

Groups:
Control Group: Historical cohort, no pharmacist MRSA PCR intervention and received IV vancomycin
Intervention Group: Pharmacist initiated MRSA PCR assay

Inclusion Criteria:
• Patients presenting the Emergency Department between 8-1-2019 and 9-30-2020
• ≥ 18 years
• Radiographic diagnosis of pneumonia
• Patients with empiric vancomycin ordered

Exclusion Criteria:
• Currently on chemotherapy for malignancy or with neutropenic fever
• Patients with lung transplant or cystic fibrosis
• Prior positive MRSA in a blood, sputum culture, or suspected MRSA infection elsewhere
• Patients with concomitant empiric agents with MRSA activity (e.g., linezolid, ceftaroline)

Sample Size:
38 patients (patient enrollment ongoing)

Primary Endpoints:
• Number of patients who received only one dose of vancomycin prior to MRSA PCR result

Secondary Endpoints:
• Number of patients in whom empiric vancomycin was avoided in the Emergency Department
• Number of patients who had positive MRSA sputum or blood culture despite negative MRSA PCR results
• Hospital length of stay and hospital mortality
• Need for vancomycin level monitoring

Results

Table: Number of patients who received one dose of Vancomycin prior to MRSA PCR Result

<table>
<thead>
<tr>
<th></th>
<th>Control (N=29)</th>
<th>Intervention (N=9)</th>
<th>P- Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr), m (IQR)</td>
<td>70 (61-82)</td>
<td>83 (65-87)</td>
<td>0.19</td>
</tr>
<tr>
<td>Sex (male), n (%)</td>
<td>15 (51.7)</td>
<td>3 (33.3)</td>
<td>0.33</td>
</tr>
<tr>
<td>History of tracheostomy, n (%)</td>
<td>4 (13.8)</td>
<td>1 (11.1)</td>
<td>1.00</td>
</tr>
<tr>
<td>Hemodialysis at admission, n (%)</td>
<td>10 (34.5)</td>
<td>3 (33.3)</td>
<td>1.00</td>
</tr>
<tr>
<td>Sepsis in the ED, n (%)</td>
<td>9 (31.0)</td>
<td>4 (44.4)</td>
<td>1.00</td>
</tr>
<tr>
<td>Septic Shock in the ED, n (%)</td>
<td>4 (44.4)</td>
<td>2 (60)</td>
<td>1.00</td>
</tr>
<tr>
<td>Indication for vancomycin, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAP</td>
<td>12 (8.5)</td>
<td>3 (60)</td>
<td>-</td>
</tr>
<tr>
<td>HCAP</td>
<td>1 (7.1)</td>
<td>1 (20)</td>
<td>-</td>
</tr>
<tr>
<td>HAP</td>
<td>0 (0)</td>
<td>1 (20)</td>
<td>-</td>
</tr>
<tr>
<td>VAP</td>
<td>1 (7.1)</td>
<td>0 (0)</td>
<td>-</td>
</tr>
<tr>
<td>MRSA PCR ordered in the ER, n (%)</td>
<td>12 (41.4)</td>
<td>8 (88.9)</td>
<td>0.01</td>
</tr>
<tr>
<td>MRSA PCR turn around time (min), m (IQR)</td>
<td>129.5 (120-218)</td>
<td>146 (112-159)</td>
<td>0.3</td>
</tr>
<tr>
<td>Vancomycin avoided in the ER, n (%)</td>
<td>0 (0)</td>
<td>1 (11.1)</td>
<td>0.02</td>
</tr>
<tr>
<td>Positive blood or sputum cultures for MRSA, n (%)</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Vancomycin level drawn, n (%)</td>
<td>12 (41.4)</td>
<td>2 (22.2)</td>
<td>0.3</td>
</tr>
<tr>
<td>Hospital length of stay (days), m (IQR)</td>
<td>7 (3-12)</td>
<td>5 (4-6)</td>
<td>0.97</td>
</tr>
<tr>
<td>Death during admission, n (%)</td>
<td>6 (20.7)</td>
<td>1 (11.1)</td>
<td>0.52</td>
</tr>
</tbody>
</table>

Results Continued

- More patients in intervention group had empiric dose of vancomycin held prior to MRSA PCR result
- More patients in the control group had vancomycin levels drawn
- Data collection is currently ongoing, and results presented are preliminary data

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Disclosure
The authors have nothing to disclose concerning possible financial or personal relationships with commercial entities.

References