Comparative Detection Of Airway MRSA In Patients With Community-Acquired Pneumonia (CAP)

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Comparative Detection of Airway MRSA in Patients with Community-Acquired Pneumonia (CAP)

Hiromichi Park D.O. PGY III, Shirin Ferdosian Najafabadi, Lian Wang Phd, David Gilbert, MD

Introduction

Empiric Vancomycin is ordered in patients with severe CAP to ensure activity vs Methicillin-resistant *Staphylococcus aureus* (MRSA). Nasal Swab PCR is currently the test of choice to detect airway colonization of *Staphylococcus aureus* (*S. aureus*) (2,3). The absence of MRSA justifies discontinuing empiric therapy with Vancomycin (1,4). Furthermore, Nasal PCR directed management is associated with decreased antibiotic use, less complications and mortality (1,5). The FilmArray PCR Pneumonia panel in a patient with CAP, it maybe necessary to include Nasal PCR for definitive exclusion of MRSA.

This study compares detection of *S. aureus* via either Nasal swab PCR or Sputum FilmArray Pneumonia panel in patients admitted with CAP.

Methods

- **585 patients** in the ED with suspected Pneumonia
- **314 excluded**
  - No Pneumonia,
  - No sputum sample
  - Nasal PCR incomplete
- **271 Evaluable cases**


FilmArray PCR panel with Sputum sampling

**112 cases of *S. aureus* detected**

**Results**

S. aureus detection frequency among tests

![Bar chart showing S. aureus detection frequency among tests](chart)

- MRSA
- MSSA
- Total cases

* P=0.004

**Performance characteristic comparisons for MRSA**

<table>
<thead>
<tr>
<th>Test of interest</th>
<th>Gold Standard</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sputum PCR</td>
<td>Nasal Swab PCR</td>
<td>63.9%</td>
<td>98.3%</td>
<td>85.2%</td>
<td>94.7%</td>
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**Procalcitonin levels among various organisms**

![Box plot showing Procalcitonin levels among various organisms](chart)

There were 2, 1, and 3 outliers for 2nd, 3rd and 4th groups, respectively.

**Discussion**

- Nasal swab PCR was more sensitive than Sputum PCR for the detection of *S. aureus*. Additionally, NPV was highest with Nasal swab PCR.
- NPV of Sputum PCR is relatively high due to the overall low incidence rate of MRSA pneumonia similar to previous studies. (3,4,5).
- *S. aureus* colonizes the nares due to lower temperatures (2).
- Procalcitonin levels can help differentiate colonization from invasion
- There was good species concordance between Nasal Swab and Sputum PCR.
- Although both Nasal and Sputum PCR had high NPV, it may be necessary to include Nasal PCR for definitive exclusion of MRSA.

**Conclusion**

- Nasal PCR for *S. aureus* is more sensitive than Sputum PCR for the detection of both MSSA and MRSA.
- To exclude MRSA in a critically ill patient with CAP, it maybe necessary to add a nasal PCR test to the new sputum FilmArray pneumonia panel.

**References**