MRSA Pneumonia

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Disclosures

None

OBJECTIVES

- Describe the epidemiology & pathogenesis of MRSA pneumonia
- Present preliminary results of The Canadian MRSA Pneumonia Outcome Study (CaMPOS)
Worldwide burden of MRSA

Epidemiology of MRSA pneumonia

• MRSA causes about 20%-40% of hospital-acquired pneumonia (HAP/HCAP) and ventilator-associated pneumonia (VAP) in US and other countries
• 1%-5% of Community associated pneumonia (CAP)
• Special concern about CA-MRSA strains: US 300/CMRSA-10
Epidemiology of MRSA pneumonia cont.

• US300/CMRSA-10 reported to cause severe pneumonia: high fever, cavitary lung lesions, hypotension, and hemoptysis followed by rapid progression to septic shock and requirement for ventilator support.

• High mortality rate (50%) was initially reported\(^1\)

• MR 37% in recent reports\(^2\)

1 Dufour et al CID 2002
2 Haque et al JCM 2012

Pathogenesis of MRSA Pneumonia


Panton- Valentine Leukocidin

Lack of a Major Role of *Staphylococcus aureus* Panton-Valentine Leukocidin in Lower Respiratory Tract Infection in Nonhuman Primates

Compared with the wild-type parental USA300 strain, the isogenic PVL deletion-mutant strain caused equivalent lower respiratory tract pathology. We conclude that PVL does not contribute to lower respiratory tract infection in this nonhuman primate model of human CA-MRSA pneumonia.

Other Virulence Factors

- Alpha-Hemolysin
- Arginine Catabolic Mobile element
- Accessory Gene Regulator

1 Wardenburg et al Nat Med, 2007
2 Diep et al, JID, 2008
3 Schewizer et al AAC, 2010
The Canadian MRSA Pneumonia Study (CaMPOS)

Study Objective:
• To determine the epidemiology, incidence, and outcome of MRSA pneumonia in adult patients admitted to Canadian hospitals

Sites:
• 1 year surveillance in eleven hospital sites from different areas across Canada.

Funding:
Sponsored by Pfizer
PI
• Dr. A. E. Simor

Study Algorithm

<table>
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<tr>
<th>MRSA isolated from Respiratory specimen or Blood</th>
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<tr>
<td>Yes</td>
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<tr>
<td>Chart review confirms diagnosis of pneumonia</td>
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<tr>
<td>Yes</td>
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<td>Patient eligible for inclusion</td>
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Laboratory Investigations

The initial clinical (respiratory) or blood isolate of MRSA from each patient was analyzed for:
• Antimicrobial susceptibilities,
• molecular type by PFGE, SCC\textsubscript{mec} type
• PVL gene detection.
CaMPOS Results

- 161 cases of MRSA pneumonia
- CAP = 45 (28%)
- HCAP = 116 (72%)
  - 36 ICU associated, 23 VAP
- Mean age was 64, SD 17.2
- Overall MRSA pneumonia rate was 0.47/10,000 patient-days
- HA-MRSA pneumonia rate was 0.33/10,000 patient days
Conclusions

- MRSA pneumonia rates in Canadian hospitals are relatively low.
- This infection was associated with 28% 30-day mortality. Variables associated with increased mortality included the presence of bacteremia or cirrhosis.
- Microbial factors (such as PFGE type, PVL gene,) were not associated with increased mortality.
THANK YOU

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