Increasing methicillin resistance of *Staphylococcus lugdunensis* in a tertiary care community hospital in Japan

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**Abstract**

Background: *Staphylococcus lugdunensis* has virulence and pathogenicity similar to that of *Staphylococcus aureus*. Methicillin resistance and presence of mecA gene are not common in *S. lugdunensis* in many parts of the world. Recently, higher prevalence of methicillin-resistant *S. lugdunensis* is reported from Taiwan and Japan. We describe the change in methicillin resistance of *S. lugdunensis* in a tertiary care community hospital in Sapporo, Japan.

Methods: We performed a retrospective study of *S. lugdunensis*, isolated from inpatients and outpatients at our hospital from 2008 to 2017. Rate of methicillin resistance of the first 5 years from 2008 to 2012, and that of the second 5 years from 2013 to 2017 were compared. Risk factors of methicillin resistance were also evaluated. Phenotypic detection of methicillin resistance was identified using broth microdilution by VITEK 2 system (bioMérieux).

Results: A total of 369 cases of *S. lugdunensis* were detected during the study period. Of all cases, 228 (61.8%) were men, and 177 (48.0%) were hospitalized. Twenty-one isolates (5.7%) were positive in blood culture, 216 (58.5%) were positive in cultures of skin and soft tissue. Methicillin-resistant strains were found in 43 (31.6%) of 136 isolates from 2008 to 2012, and in 108 (46.4%) of 233 from 2013 to 2017 (OR 21.7%, 95% CI: 10.9-43.4).

We confirmed that the methicillin sensitivity determined by VITEK 2 system (bioMérieux) and Microscan series (Beckman Coulter) correspond with positivity of mecA gene, for 37 of *S. lugdunensis* isolates from August 2016 to August 2017.

Primary endpoint

We compared rate of methicillin resistance of the first 5 years from 2008 to 2012, and that of the second 5 years from 2013 to 2017.

Secondary endpoint

We analyzed the risk of methicillin resistance for each factor: age, gender, disposition (inpatient or outpatient), and underlying disease.

We also compared rate of other antibiotics resistance of the first 5 years from 2008 to 2012, and that of the second 5 years from 2013 to 2017.

We performed Chi-squared test to compare the rate of methicillin resistance among each factor: sex, age, disposition, and underlying disease.

**Result**

**Table 1: Factor of Methicillin-resistant *Staphylococcus lugdunensis***

<table>
<thead>
<tr>
<th>Year</th>
<th>Susceptible</th>
<th>Resistant</th>
<th>P</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008/1/1-2012/12/31</td>
<td>58 (33.7)</td>
<td>95 (47.7)</td>
<td>0.001</td>
<td>0.73</td>
<td>0.24-2.17</td>
</tr>
<tr>
<td>2013/1/1-2017/12/31</td>
<td>89 (40.2)</td>
<td>109 (49.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2: Oxacillin and other antibiotics resistance of *Staphylococcus lugdunensis***

<table>
<thead>
<tr>
<th>Year</th>
<th>Susceptible</th>
<th>Resistant</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018/1/1-2017/12/31</td>
<td>58 (33.7)</td>
<td>95 (47.7)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

• In our hospital, methicillin-resistant *S. lugdunensis* emerged at a higher rate after 2013 compared to before 2012.

• Similar trends were found for gentamicin and minocycline.

• Gender, age, or underlying disease has no association with presence of methicillin-resistance.

• On the other hand, the rate of methicillin-resistant *S. lugdunensis* is higher in hospitalized cases.

• There are reports suggesting the relationship between medical-related infection and high rate of methicillin-resistant *S. lugdunensis*, and we consider the possibility that nosocomial transmission is one factor to increase.

• *S. lugdunensis* has pathogenicity as high as *S. aureus*, infection control such as contact isolation could be considered as MRSAs.