Resistance of *Pseudomonas aeruginosa* to imipenem in Swiss hospitals: correlation with consumption and diversity of antibiotics


### Background

*Pseudomonas aeruginosa* is a pathogen responsible for nosocomial infections. Studies showed that patients suffering from *P. aeruginosa* resistant to imipenem (PARI) had a hospital stay and in-hospital mortality higher than those sensitive.\(^1\)\(^2\)\(^3\) There is therefore a clear interest to stabilize an increase of their prevalence.

### Objectives

The objectives were to explore if the proportion of PARI varied from one Swiss region to another and if there was a correlation with the consumption of antibiotics and their diversity.

### Method

The proportions of *P. aeruginosa* resistant to imipenem isolates and antibiotic consumption data expressed in defined daily doses (DDD) per 100 bed-days or in proportion of total use, the number of different antibiotics prescribed were provided for 38 acute care hospitals by anresis, the Swiss national surveillance system for antibiotic resistance and antibiotic consumption. Data were combined for the years 2004 to 2010.

### Discussion and conclusion

The total consumption, the use of imipenem and meropenem, the number of different antibiotics prescribed and the proportion of very broad spectrum antibiotics had an impact on the prevalence of *P. aeruginosa* resistant to imipenem.

To limit the increase of this prevalence, some measures (f.e. list of restricted antibiotics, nominal prescription) must be implemented.

### Results

1. For all hospitals, the proportion of resistant isolates was associated with the total antibiotic consumption, the use of imipenem and meropenem, the number of different antibiotics prescribed and the proportion of very broad spectrum antibiotics.

![Graphs showing correlation between antibiotic use and PARI proportion.](Image)

2. The proportion of PARI was nearly two times higher in hospitals in Eastern (weighted mean, 20%) and Western (19%) than in those from Mid Switzerland (11%) (Kruskal-Wallis test, \(p = 0.24\)).

3. In Eastern region, the proportion of PARI was explained by the use of imipenem and meropenem and the number of different antibiotics prescribed. In Western region, it was explained by the use of imipenem and meropenem, the number of different antibiotics prescribed and the proportion of very broad-spectrum antibiotics. No correlation was observed for the hospitals of the Mid region. The multiple regression showed that the proportion of PARI was explained by the proportion of very broad-spectrum antibiotics in Western region.

<table>
<thead>
<tr>
<th>East</th>
<th>West</th>
<th>Mid</th>
</tr>
</thead>
<tbody>
<tr>
<td>coef</td>
<td>p</td>
<td>coef</td>
</tr>
<tr>
<td>0.003</td>
<td>NS</td>
<td>0.003</td>
</tr>
<tr>
<td>0.029</td>
<td>&lt; 0.05</td>
<td>0.046</td>
</tr>
<tr>
<td>0.008</td>
<td>&lt; 0.05</td>
<td>0.006</td>
</tr>
<tr>
<td>0.978</td>
<td>NS</td>
<td>1.700</td>
</tr>
</tbody>
</table>

### References

1. Lautenbach et al., Infect Control Hosp Epidemiol, 2010, doi: 10.1086/649021

### Acknowledgements

We thank the sentinel network participants for their important contribution in providing data.

### Contact

Catherine.Pluss@chuv.ch

Congrès GSASA – PharmaSuisse, Interlaken, 2011