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

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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 [1-3]. 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

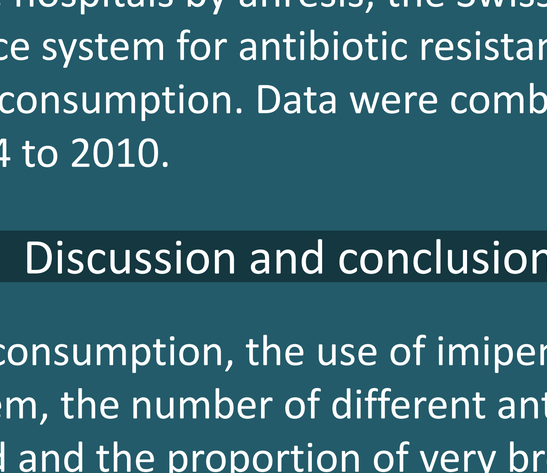
The proportions of *P. aeruginosa* resistant to imipenem isolates and antibiotic consumption data expressed in defined daily doses (DDD) per 100 bed-days or in proportion of total use, the number of different antibiotics prescribed were provided for 38 acute care hospitals by anresis, the Swiss national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

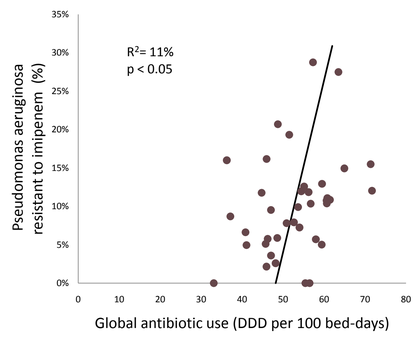
To limit the increase of this prevalence, some measures (f.e. list of restricted antibiotics, nominal prescription) must be implemented.

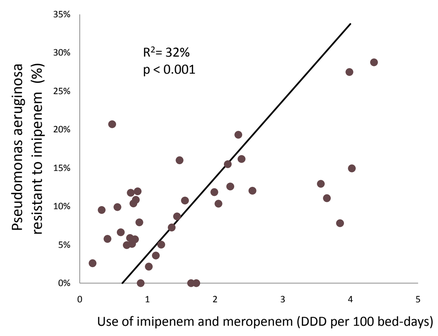
Stratification by Swiss regions

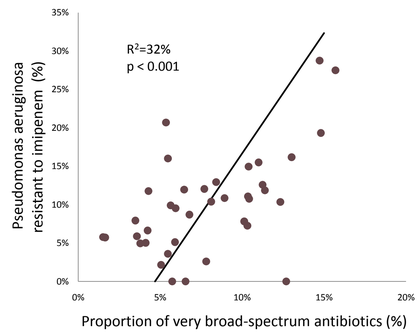


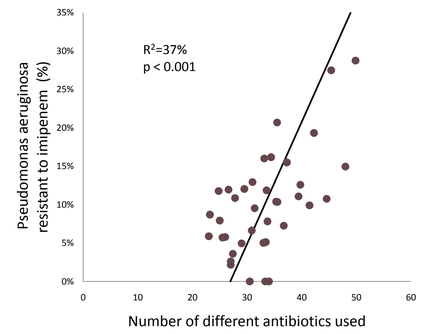
Results

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.









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.

	East		West		Mid	
	coef	*p*	*coef*	*p*	*coef*	*p*
Simple linear regression						
Global antibiotic use	0.003	NS	0.003	NS	0.002	NS
Use of imipenem and meropenem	0.029	< 0.05	0.046	< 0.05	0.032	NS
Number of different antibiotics used	0.008	< 0.05	0.006	< 0.01	0.003	NS
Proportion of broad-spectrum antibiotics	0.978	NS	1.700	< 0.001	0.528	NS
Multiple linear regression						
Use of imipenem and meropenem	0.058	NS	- 0.007	NS	0.023	NS
Number of different antibiotics used	0.006	NS	0.002	NS	0.264	NS
Proportion of broad-spectrum antibiotics	-1.078	NS	1.519	< 0.05	-0.062	NS

NS = not significant

References

[1] Lautenbach et al., Infect Control Hosp Epidemio, 2010, doi: 10.1086/649021

[2] Furtado et al., J Crit Care, 2009, doi: 10.1016/j.jcjr.2009.03.006

[3] Joo EJ et al., Microb Drug Resist, 2011, doi: 10.1089/mdr.2010.0170

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