

Correlation Study of *Pseudomonas aeruginosa* Antibiotics Sensitivity and Antibiotics Consumption in a Private Hospital in Surabaya, Indonesia

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Objective

This study evaluates the correlation of *Pseudomonas aeruginosa* antibiotics sensitivity and antibiotics consumption at a private hospital in Surabaya, Indonesia from 2001 to 2010.

Methods

The data of antibiotics sensitivity testing to *Pseudomonas aeruginosa* and antibiotics consumption were collected retrospectively and correlated annually from 2001 to 2010. The Defined Daily Dose (DDD) per 100 bed days was used as an antibiotic measuring unit. The strength of the relationship between antibiotics sensitivity and antibiotics consumption is quantified by Pearson product moment correlation coefficient (r).

Results

There was a downtrend of antibiotics sensitivity to *Pseudomonas aeruginosa* from 2001 to 2010. In 2001, the sensitivity of amikacin, ciprofloxacin, ceftazidime, piperacillin-tazobactam and meropenem to *Pseudomonas aeruginosa* were $\geq 70\%$. However, only piperacillin-tazobactam had $\geq 70\%$ sensitivity to *Pseudomonas aeruginosa* in 2010. Piperacillin-tazobactam was more resistant to *Pseudomonas aeruginosa* resistance mechanism compared to meropenem. Amikacin was more resistant to *Pseudomonas aeruginosa* resistance mechanism compared to ceftazidime. In nine years, the consumption of ceftazidime has increased for approximately two-fold, and its sensitivity to *Pseudomonas aeruginosa* has decreased for almost 20%. The

correlation (r) between antibiotics sensitivity and ceftazidime (0.36) was higher than the correlation between antibiotics sensitivity and amikacin (0.03).

Discussion

Pseudomonas aeruginosa has an outer membrane and a capability to transfer mutational genes which are resistant to antibiotics. Some antibiotics are not able to permeate the membrane of *Pseudomonas aeruginosa*, while the others could enter into its periplasmic space and are limited by the permeability mutation. A judicious use of antibiotics will minimize the resistance of antibiotics.

Conclusion

The strength of the relationship between antibiotics sensitivity and antibiotics consumption varied. The higher ceftazidime consumption was more likely to reduce antibiotics sensitivity than amikacin consumption.

Keywords: antibiogram, antibiotic susceptibility test, resistant determinant