



Economic aspects of the use of carbapenems in critically ill patients

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Background. Severe sepsis is leading cause of mortality in intensive care units (ICUs). Efficient and cost-effective use of antibiotics is necessary for improving treatment outcomes. The aim was to investigate cost-utility and cost-effectiveness of carbapenems vs. piperacillin/tazobactam as they are commonly used in the treatment of sepsis in our ICU.

Materials. The study was conducted from August 2014 to May 2015 in the ICU of a tertiary university hospital. The cost-effectiveness and cost-utility analysis conducted included all adult critically ill patients with sepsis who had received either carbapenem (n=56) or piperacillin/tazobactam (n=28). Results were expressed in life-years gained (LYG) adjusted with estimated reduction of LYG in patients with sepsis (0.51). Quality-adjusted life years (QALYs) were obtained by multiplying LYGs with the utility value for sepsis 0.69. The incremental cost-effectiveness ratio (ICER) was calculated as the ratio of differences between LYGs and cost of treatment of both groups. The incremental cost-utility ratio (ICUR) was the ratio of differences between QALYs and cost of treatment. The confidence interval was obtained using Bootstrap sampling (2000 replications). Mann Whitney U test was used for statistical analysis between groups.

Results. There were no differences between patients regarding age, gender and length of stay in ICU. Patients in the carbapenems group had tendency of higher survival rate (48 %) in comparison to the non-carbapenem group (39 %). Costs were higher in the carbapenem group in comparison to patients treated with piperacillin/tazobactam (€ 752 per patient compared to € 399 per patient; $p < 0.001$). The ICER was € 105 per LYG and the ICUR was € 66 per QALY for carbapenem.

	Carbapenem group (56)	Piperacillin/tazobactam group (28)	Difference (95% CI)
COST (€)	752 (552)	399 (374)	353 (196-596)
LYG	15,96 (19,87)	8,57 (14,31)	7,39 (0,0005-14,59)
LYG corr.	8,14 (10,13)	4,37 (7,30)	3,77 (0,05-7,41)
QALY	5,62 (6,99)	3,01 (5,04)	2,60 (0,01-5,19)
ICER	€ 105 per LYG		
ICUR	€ 66 per QALY		

Conclusion: The results showed that the use of carbapenems in critically ill patients with sepsis was obtained with higher efficacy and costs. The low values for ICER and ICUR indicate that carbapenem is cost-effective in patients with sepsis.

CP-052

J01-Antibacterials for systemic use