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Paper Poster Session V

Pharmacokinetics in various patient groups

Piperacillin pharmacokinetics and pharmacodynamics during continuous infusion in critically ill patients

S. Helbig[1], O.R. Frey[1], A. Roehr[1], A. Köberer[1], T. Fuchs[1], A. Brinkmann[1]

[1]*Hospital of Heidenheim gGmbH, Heidenheim, Germany*

Objectives

The purpose of this study was to describe Piperacillin pharmacokinetics and pharmacodynamics during continuous infusion in critically ill patients and to determine the frequency in which pharmacodynamics targets are achieved.

Methods

Critically ill patients receiving Piperacillin (+Tazobactam) in 2013 were eligible for this study. A loading dose of 2000 mg and individualised maintenance doses, based on renal function and applied renal replacement therapy (RRT), were administered by continuous infusion. Within the first 12-24(48) hours of therapy the first serum level was drawn. Primary target concentration was a steady state concentration of >(16)32-100 mg/l. Overdose was defined by a serum level > 100 mg/l, reflecting a Piperacillin dose of > 32 g/ 24 h in normal subjects.

Results

See table for results.

Number of patients	180 (116 m; 64f)	Mean SAPS II (median; range)	37.2 (37; 0-83)	Patients with severe sepsis	53 (29,4 %)
Mean age [years] (median; range)	71 (75; 24-91)	Mean TISS (median; range)	10.4 (10; 0-36)	Patients with septic shock	50 (27,8 %)
Number of measured Serum-Levels	328	Number of renal replacement therapy	35 (19.4 %)	Success of therapy	129 (72.1 %)
Mean dose [g/24h] (median; range)	8.2 (8.0; 3.0-20.0)	Mean duration of therapy [days] (median; range)	6.5 (6; 2-19)	ICU mortality	57 (31.7 %)
Mean piperacillin-clearance [l/h] (median; range)	7.02 (5.95; 1.23-27.78)	Mean serum-levels [mg/l] (median; range)	59.5 (55.0; 14.5-305.0)	Serum-levels >32-64 mg/l	170 (51.8 %)
Serum-levels >64-100 mg/l	90 (27.4 %)	Serum-levels >16-32 mg/l	37 (11.3 %)	Serum-levels < 16 mg/l	1 (0.3 %)
Serum-levels >100 mg/l	23 (7.0 %)	Dose increases after initial measurement	10 (5.6%)	Dose reductions after initial measurement	32 (17.8 %)

Conclusion

Piperacillin clearance in critically ill patients shows a high variation, requiring a wide range of doses. By individualisation and optimisation of antibiotic dosing, PK/PD targets can be achieved in the majority of patients. Our study suggests that individual dosing strategies, as well as application of Therapeutic Drug Monitoring (TDM) are advisable to avoid either the risk of treatment failure or dose dependent toxicity. In addition multicentre clinical trials are needed to evaluate the possible influence on clinical outcomes.