

**L0031 The effect of renal replacement therapy and antibiotic dose on antibiotic concentrations in critically ill patients: The SMART Study**

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**Background:** In critically ill patients treated with renal replacement therapy (RRT), we sought to test the hypothesis that there would be significant variability in RRT techniques, antibiotic dosing, and trough antibiotic concentrations which commonly fail to meet therapeutic targets.

**Materials/methods:** This was a prospective, observational, multi-national, pharmacokinetic study in 29 intensive care units. Patient demographic, RRT and clinical data were collected. Trough antibiotic concentrations of meropenem, piperacillin-tazobactam, vancomycin and linezolid were measured. We calculated estimated total renal clearance (eTRCL) as the sum of the total effluent rate during continuous RRT and measured creatinine clearance. We assessed the achievement of high and low therapeutic trough concentrations.

**Results:** Across 14 countries, we enrolled 384 patients and obtained 514 trough antibiotic concentrations. RRT prescribing and endogenous renal function varied widely with an overall median eTRCL of 50 mL/min (interquartile range [IQR] 35-66). There was also wide variability (4-8 fold) in antibiotic dosing regimens. Increasing eTRCL was associated with decreasing trough concentrations for piperacillin, tazobactam and vancomycin ( $p < 0.05$ ). The median (IQR) trough concentration for meropenem was 12.1 mg/L (7.9-18.8), piperacillin 78.6 mg/L (50.1-127.3), tazobactam 9.5 mg/L (6.3-14.2), vancomycin 14.3 mg/L (11.7-21.8), and linezolid 1.7 mg/L (1.5-5.8). Trough concentrations failed to meet higher targets in 36% and 26%, 72% and lower targets in 4%, 55% and 4% of patients for meropenem, piperacillin and vancomycin respectively.

**Conclusions:** In patients treated with RRT, highly varied RRT prescription and eTRCL and highly varied antibiotic dosing result in antibiotic concentrations that fail to meet therapeutic targets in many patients.

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