

Optimal Meropenem Dosing Regimens in Patients Undergoing Continuous Renal Replacement Therapy: Systematic Review and Monte Carlo Simulations

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Keywords

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Abstract

Introduction: The optimal meropenem dosing regimens in critically ill patients receiving continuous renal replacement therapy (CRRT) based on pharmacokinetic and pharmacodynamic (PD) concepts are not well established. This study aimed to (1) gather the available published pharmacokinetic studies conducted in septic patients receiving CRRT and (2) to define the optimal meropenem dosing regimens in these populations via Monte Carlo simulations. **Methods:** We used

Medical Subject Headings “meropenem,” “continuous renal replacement therapy,” and “pharmacokinetics” or related terms to identify studies for systematic review. A one-compartment pharmacokinetic model was conducted to predict meropenem levels for the initial 48 h of therapy. The PD targets were 40% of free drug above a threshold of 1 times the minimum inhibitory concentration (MIC) (40% fT > MIC), 4 times the MIC (40% fT > 4MIC), and an additional target of free drug level above 1 times MIC 100% of the time (fT > MIC). The dose that achieved at least 90% of the probability of target attainment (PTA) was defined as an optimal dose. **Results:** Twenty-one articles were included for our systematic review. The necessary pharmacokinetic parameters such as volume of distribution and CRRT clearance