

BETA-LACTAM ANTIBIOTICS IN CRITICALLY ILL CHILDREN – RISK FACTORS FOR SUBOPTIMAL EXPOSURE AND CLINICAL FAILURE

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Background and aims In critically ill children, severely altered pharmacokinetics often result in subtherapeutic antibiotic concentrations. However, it remains unclear how to recognize those patients most at risk for suboptimal exposure and outcome data are lacking. This study aimed to identify risk factors for target non-attainment and clinical failure in critically ill children treated with beta-lactam antibiotics. **Methods** This observational cohort study included critically ill children aged 1 month to 15 years, treated intravenously with amoxicillin-clavulanic acid, piperacillin-tazobactam or meropenem. Steady-state trough plasma concentrations were considered therapeutic if \geq MIC of the (suspected) pathogen. Risk factors were identified by logistic regression analysis. **Results** 382 trough concentrations were obtained from 157 patients (median age 1.25 years, Q1 0.4; Q3 4.2). Subtherapeutic concentrations were measured in 75.0%, 97.9% and 61.2% of patients treated with amoxicillin-clavulanic acid, piperacillin-tazobactam and meropenem, respectively. eGFR ($p < 0.001$) and the absence of vasopressor treatment ($p = 0.026$) were found as independent predictors of target non-attainment, whilst log transformed CRP was significantly related to clinical outcome ($p = 0.049$). An association between antibiotic concentrations and clinical failure (22.9%) was not observed. **Conclusions** Subtherapeutic β -lactam antibiotic concentrations are common in critically ill children and correlate with renal function. Commonly used eGFR equations are helpful to identify patients who require higher doses. Future studies should focus on dose optimization and evaluation of its effect on clinical outcome.