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Paper Poster Session
PK/PD of agents against Gram-positives

The impact of vancomycin protein binding on target attainment in critically ill children

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Background: The objectives of this study were to investigate plasma protein binding and to evaluate target attainment rates of vancomycin therapy in critically ill children.

Material/methods: Paediatric intensive care patients, in whom intravenous intermittent (ID) or continuous (CD) treatment with vancomycin was indicated, were included. Covariates on free vancomycin concentrations and fraction were tested using a linear mixed-model analysis. The evaluated PK/PD targets included AUC/MIC >= 400, fAUC/MIC >= 200, total trough concentration between 10-15 mg/L (ID) and total concentration between 20-25 mg/L (CD).

Results: 188 plasma samples were collected from 32 patients (median age: 4.1 years; IQR 1.3-6.3 years). Total vancomycin concentration and total protein concentration were identified as significant covariates on the free vancomycin concentration. The free vancomycin fraction (median 71.1%; IQR 65.4-79.7%) was significantly correlated with total protein concentration and highly variable within and between patients. The targets of AUC/MIC >= 400 and fAUC/MIC >= 200 were achieved in 56% and 83% of patients respectively. Total trough concentration (ID) (median: 6.7 mg/L;IQR 4.7-8.7mg/L) and total concentration (CD) (median: 14.5 mg/L;IQR 10.2-18.7 mg/L) were below the aimed target concentrations except for three patients.

Conclusions: The free fraction of vancomycin in our paediatric population was generally higher than previously reported in adults and exhibited large variability. The number of patients achieving target vancomycin concentrations varied widely depending upon the type of PK/PD target used. These results highlight the need for protein binding assessment in future vancomycin PK/PD research.