Oral

# [O25-7] O25-7: Infectious diseases

Chairs: Mariadelfina Molinaro, Italy / Mitsuru Sugawara, Japan
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## [O25-7-2] The novel pharmacokinetic parameter area under the trough level (AUTL) associates the clinical efficacy of vancomycin in elderly patients with methicillin-resistant Staphylococcus aureus pneumonia

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### Background

The pharmacokinetic-pharmacodynamic parameter that best predicts the efficacy of vancomycin is the ratio of the area under the concentration versus time curve (AUC) to the minimum inhibitory concentration (MIC). A 24-h AUC ($AUC_{24}$)/MIC ratio 400 was recommended in an American consensus review, but vancomycin treatment occasionally fails despite maintenance of $AUC_{24}$/MIC 400. We evaluated the association between clinical efficacy of vancomycin and two novel pharmacokinetic parameters, the “area under the trough level” (AUTL) and the “area above the trough level” (AATL), in hospitalized elderly patients with methicillin-resistant *Staphylococcus aureus* (MRSA) pneumonia.

### Methods

The subjects were hospitalized elderly patients who were administered vancomycin for treatment of MRSA pneumonia between 2006 and 2012 at Sasebo Chuo Hospital (Nagasaki, Japan). Pharmacokinetic parameters of vancomycin were estimated for each patient by Bayesian analysis using population pharmacokinetic parameters for Japanese patients. Based on the patient-specific parameters thus obtained, $AUC_{24}$ values were calculated as the vancomycin dosage divided by vancomycin clearance. AUTL was calculated as the trough serum concentration multiplied by 24 h, while AATL was calculated by subtracting AUTL from $AUC_{24}$.

### Results

The 81 patients were divided into an effective group (n = 54) and an ineffective group (n = 27) based on the response to vancomycin therapy. Logistic regression analysis demonstrated that efficacy of vancomycin was more strongly associated with AUTL than $AUC_{24}$. The optimal cutoff value of AUTL was 331 mg·h/mL, which meant that the optimal cutoff value of the trough serum concentration was 13.8 mg/mL.

### Conclusions

Efficacy of vancomycin was associated with AUTL, a novel pharmacokinetic parameter. Determination of AUTL or the trough vancomycin concentration is a useful and practical method for monitoring the efficacy of vancomycin in hospitalized elderly patients with MRSA pneumonia. Given that nephrotoxicity may increase with a $C_{trough}$ in excess of 15 mg/mL, this level should ideally not be exceeded.