Poster

[P25-4] P25-4: Anti-infective drugs (4): Vancomycin

Chair: Noboru Okamura, Japan

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[P25-4-7] Usefulness of the Bayesian estimation based TDM for vancomycin dose individualization in patients with continuous renal replacement therapy

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Background

Although blood vancomycin (VCM) trough concentration must be adjusted in narrow range (10-20 μg/mL), it is difficult in patients with continuous renal replacement therapy (CRRT) due to variable CRRT intensity and body clearance caused by sepsis. Because the Bayesian estimation based TDM (Bayes TDM) potentially estimates body clearance using their VCM population pharmacokinetic (VCM-PPK) model, the Bayes TDM may control VCM concentration even in patients with CRRT. In this study, we assessed the usefulness of the Bayes TDM for VCM dose individualization in patients with CRRT.

Methods

This observational study was performed after approval of institutional review board in Kumamoto University Hospital. Eligible adult patients were undergoing CRRT, and VCM trough concentration was measured 2 times (first and subsequent concentration) at least 48 hours. The Bayes TDM was performed using first concentration, and was assessed at subsequent concentration in patients from August 2014 to February 2017 by comparing to patients from September 2011 to January 2014. For the assessment, we evaluated probability of therapeutic range (10-20 μg/mL) attainment (TA, %), variation, and, root mean square percentage error (RMSPE, %) of subsequent concentration.

Results

We investigated 13 (comparison group) and 16 (assessment group) subjects. Median (range) of the first/subsequent concentration were 10.1 (6 –19.2)/13.6 (6.2 –30.2) μg/mL in the comparison group, 12.2 (2.8 –32.2)/18.9 (12.3 –24.1) μg/mL in the assessment group, respectively. Median (range) of adjusted VCM dose and efflux rate of CRRT were 500 (300 –1500) mg/day and 1000 mL/hr in the assessment group at subsequent concentration. TA and the variation were improved at subsequent concentration in the assessment group (54 % to 81 %, not significant, Fisher’s exact test; 50.5 to 14.0, $p = 0.02$, F test), compared to the comparison group. RMSPE was 21.3 % in the assessment group, calculating 88 % of TA when we tried to adjust VCM dose to get at 15 μg/mL of the trough concentration.

Conclusions

The Bayes TDM may be useful for VCM dose individualization in patients with CRRT.