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Comparison of Mw\Pharm 3.30 (DOS) and Mw\Pharm ++ (Windows) Versions of Pharmacokinetic Software for PK/PD Modelling of Vancomycin in Continuous Administration

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Objective: For a long time, the Mw\Pharm software suite (MEDI\WARE, Prague, Czech Republic/Groningen, Netherlands) has been used for PK/PD modelling in therapeutic drug monitoring (TDM). The aim of this study was to find the best model in the newer Windows version of Mw\Pharm++ 1.3.5.558 (WIN) for continuous administration of vancomycin.

Patients: Twenty adult patients with a mean age of 66 ± 12 years, body weight 85 ± 16 kg, and median dose 1,625 g/24 h were repeatedly examined for vancomycin.

Methods: Concentrations predicted by *"#vancomycin_adult_k_C2"*, *"#vancomycin_adult_C2"*, *"vancomycin_adult_C2"*, *"vancomycin_C1"* WIN models and *"vancomycin (cont.inf.) %ahz"* (DOS1) and *"vancomycin adult"* DOS models were compared with the measured values and with the DOS1 model.

Statistics: Percentage prediction error (%PE) calculated as (predicted-measured)/measured or (predicted-DOS1)/DOS1, RMSE, Bland-Altman bias, Pearson's coefficient of rank correlation (R), Student's t-test. Statistical analysis was performed using the GraphPad Prism version 5.00 for Windows.

Results: %PE values varied between –3.2 ± 33.0% and –7.4 ± 36.7%, with the exception of *"vancomycin_C1"*, the only one-compartment model, where it was –20.8 ± 39.4%. The best outcomes were achieved with *"vancomycin adult"*. The *"#vancomycin_adult_k_C2"* model produced the lowest %PE, RMSE, and Bland-Altman bias among the WIN models, but its correlation (Pearson's R) was less tight. RMSE was the same in *"vancomycin_adult_C2"* while %PE and Bland-Altman bias were similar, with slightly better correlation when compared to *"#vancomycin_adult_k_C2"*. The %PE value between the two DOS models was 4.1 ± 13.9% (NS); *"vancomycin adult"* produced slightly better outcomes than DOS1.

Conclusion: *"vancomycin_adult_C2"* and *"#vancomycin_adult_k_C2"* produced the best outcomes between WIN models. Both DOS models produced lower bias and their prediction was comparable.

Key words: PK/PD modelling, vancomycin, Mw\Pharm, therapeutic drug monitoring, continuous administration.

Porovnání Mw\Pharm 3.30 (DOS) a Mw\Pharm ++ (Windows) verze farmakokinetického softwaru pro PK/PD modelování hladin vankomycinu aplikovaného v kontinuální infuzi

Účel studie: Mw\Pharm software (MEDI\WARE, Prague, Czech Republic / Groningen, Netherlands) je dlouhodobě používán pro PK/PD modelování pro terapeutické monitorování hladin léčiv (TDM). Cílem práce bylo najít nejvhodnější model pro kontinuální aplikaci vankomycinu v novější Windows verzi Mw\Pharm++ 1.3.5.558 (WIN).

Pacienti: 20 dospělých pacientů (průměrný věk 66 ± 12 let, hmotnost 85 ± 16 kg), bylo opakovaně vyšetřeno na hladinu vankomycinu. Medián dávky byl 1 625 g/24 h. Koncentrace vankomycinu predikované pomocí WIN modelů *„#vancomycin_adult_k_C2"*, *„#vancomycin_adult_C2"*, *„vancomycin_adult_C2"*, *„vancomycin_C1"* a DOS modelů *„vancomycin (cont.inf.) %ahz"* (DOS1) a *„vancomycin adult"* byly porovnány s naměřenou hodnotou a DOS1 modelem.

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