Poster:

A simple LC-MS/MS method for ganciclovir determination in dried plasma collected by Mitra™-VAMS and its application in pediatric renal transplant recipients and neonates

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Background: Ganciclovir is an antiviral agent primarily used to treat infections caused by cytomegalovirus (CMV), particularly in immunocompromised individuals, such as transplant recipients and neonates infected congenitally. The pharmacodynamic mechanism of action is based on inhibiting viral DNA synthesis, thereby suppressing CMV replication. Ganciclovir is associated with significant side effects, including bone marrow suppression. Therefore, TDM (therapeutic drug monitoring) of GCV is helpful for pharmacotherapy optimization. The study aimed to develop and validate a new LC-MS/MS (liquid chromatography-tandem mass spectrometry) method for the determination of GCV in plasma collected by Mitra™ VAMS (volumetric-absorptive microsampling) technique for increasing of stability of analyte.

Methods: Whole-blood (classic venous collection) and VAMS samples (collection from test tube) for this study were obtained during regular GCV TDM tests form January 2024 to April 2024 from 150 pediatric renal transplant recipients and neonates treated at the Children's Memorial Health Institute (CMHI) in Warsaw. The GCV levels were measured in VAMS samples using LC-MS/MS technique, while in the plasma/serum samples were determinated using HPLC-DAD and LC-MS/MS techniques. The methods were previously optimized and validated.

Results: The method has been successfully optimized and validated – the results fulfilled EMA and IATDM&CT acceptance criteria about bioanalytical method validation. The VAMS technique extended the stability of analyte up to 2 months in ambient temperature in the dark. The method was used for determination of dried plasma VAMS samples from neonates and renal transplant recipients treated with GCV. Correlation between GCV concentration in clinical plasma and VAMS samples were acceptable – the Pearson's correlation was 0.988, and average Bland-Altman bias: -0.38%.

Conclusions: The VAMS technique helps increase sample stability. Additionally, the sample collected in that way is more accessible for transport and shipment.

Key Words: ganciclovir, VAMS, TDM, CMV, LC-MS/MS