Poster

[P27-4] P27-4: Cardiovascular drugs (1)

Chair: Philip David Walson, Germany

Wed. Sep 27, 2017 12:30 PM - 1:30 PM Annex Hall (1F)

(Wed. Sep 27, 2017 12:30 PM - 1:30 PM Annex Hall)

[P27-4-6] Cardiovascular drug monitoring using quantitative LC-HRMS analysis of self-collected micro-volume blood samples

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Keywords: Dried blood spot (DBS) Volumetric Absorptive Micro-sampling (VAMS) LC-HRMS, Medication adherence

Background

Evidence suggests that >50% of cardiovascular (CVD) disease patients do not adhere to treatment thus impacting on patient health, additional healthcare costs and medicines wastage. DBS microsampling combined with LC-ToF MS detection has the potential to offer a simple means to monitor drug levels to enable clinicians to personalise optimum treatment for patients. This research compared the use of Whatman 903 dried blood spot (DBS) sample collection cards with volumetric absorptive micro-sampling (VAMS)/Mitra ® technology for use as a personal sampling methodology.

Methods

Recruited volunteers were given demonstrations and information sheets concerning the investigation and sample collection. A liquid chromatography-high resolution mass spectrometry (LC-HRMS) method was validated for the determination of the top 11 UK prescribed cardiovascular drugs. For the preparation of DBS and VAMS calibration samples whole blood was spiked with different levels of the 11 target analytes. 8mm DBS discs or the absorptive VAMS tips were extracted with methanol containing the internal standard. The bioanalytical method was applied to fingerprick samples taken from volunteers some of whom were prescribed one or more of the target drugs. Volunteers not prescribed drugs represented blank samples.

Results

Approximately 17% of the DBS spots were unacceptable for quantification whereas 1 VAMS sample tip was rejected due to incomplete collection. Validation showed comparable quantitative results between the DBS and VAMS microsampling methods for the 11 target drugs. For two study groups anticipated cardiovascular drugs were detected in 83% of the pre-warned group and 73% of the trial group. The latter figure was higher than expected possibly due to the ‘white coat compliance’.

The detected drug levels were in line with literature values for the half-life and C_{max} for a given drug, Non-adherence was not uniform amongst the cardiovascular drugs. All volunteers preferred the VAMS methodology.

Conclusions

Both microsampling methods coupled with LC-HRMS analyses facilitate the identification of patients where the prescription apparently failed to produce detectable drug levels in the blood. This information should inform clinicians how to proceed in the healthcare process in the event of poor patient progress.