Comparing volumetric absorptive microsampling Mitra® with dried plasma spot for quantification of triazoles in plasma

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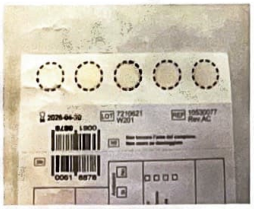
Background & Aims

Recently, growing attention has emerged for micropsampling techniques as alternative to dried blood samples (DBS) for therapeutic drug monitoring (TDM). Volumetric Absorptive Microsampling (VAMS), called Mitra® (Neoteryx), are devices consisting of porous absorbent tips that allow collection of few blood volumes (~ 10 µl) overcoming the hematocrit effect (1). So far, Mitra® have been used in several pharmacokinetic studies (2-5).
Here, we have compared plasma concentrations of three antifungal agents (Voriconazole, Posaconazole and Isavuconazole) to dried plasma spot (DPS) and Mitra®.

Methods

50 samples of plasma, DPS and Mitra® were obtained from pediatric patients hospitalized in our Centre. Mitra® were collected by dipping tips into whole blood before centrifugation for plasma recovery. Antifungal concentrations were measured by using a validated LC-MS/MS kit (MassTox® Antimycotic Drugs/EXTENDED) provided by Chromsystems (Chromsystems Instruments & Chemicals), on a Waters XEVO® TQ-S micro Triple Quadrupole Mass Spectrometry.

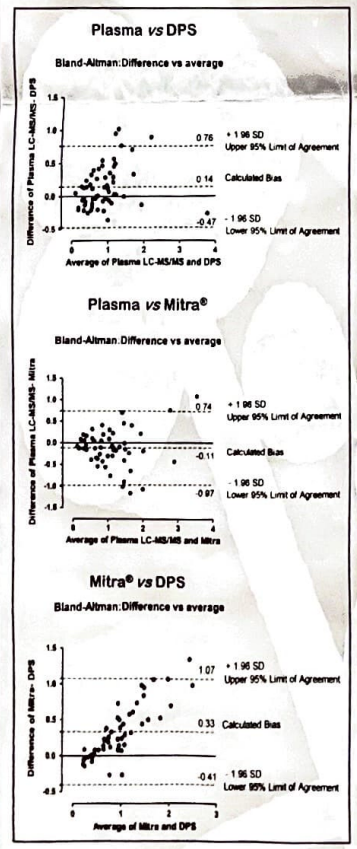


DPS, dried plasma spot

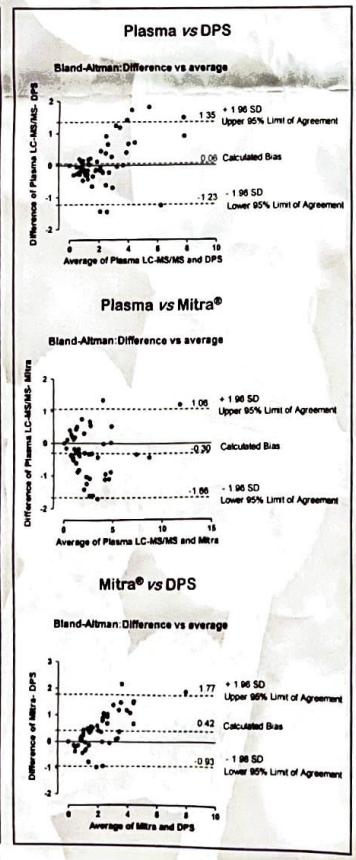
Mitra® micro-sampling device

XEVO® TQ-S micro Triple Quadrupole Mass Spectrometry

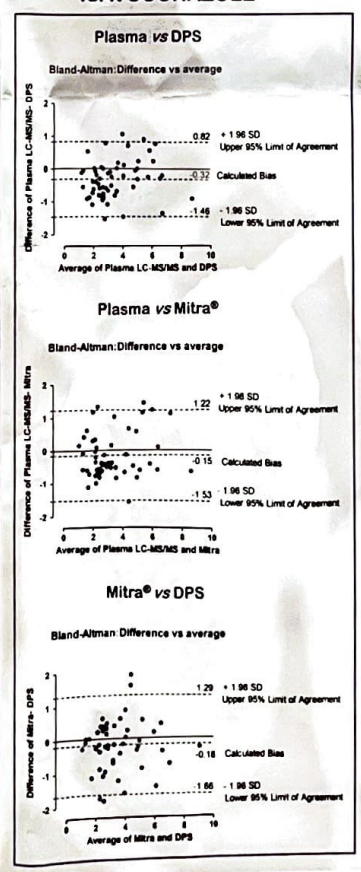
POSACONAZOLE



VORICONAZOLE



ISAVUCONAZOLE



Results

A positive correlation was found for Posaconazole plasma *vs* DPS (Spearman r=0.82, p<0.001). Bland-Altman test gave a bias of 0.14. A similar result was obtained for Posaconazole plasma *vs* Mitra® (Spearman r=0.84, p<0.001) while bias was -0.11. Correlation of Voriconazole plasma *vs* DPS produced a Spearman r of 0.94 (p<0.001) and a bias of 0.06. A positive correlation was observed for Voriconazole Mitra® (r=0.91, p<0.001) with a bias of -0.30. Isavuconazole correlations gave for DPS r= 0.93 (p<0.001) and Mitra® r= 0.88 (p<0.001). A bias of -0.32 and -0.15 were observed for DPS and Mitra®, respectively.

Conclusions

Our results demonstrate that DPS and Mitra® could be used as alternative to CVC (central venous catheter) blood drawing for TDM of antifungal agents. However, Mitra® do not require plasma recovery and could be suitable for pediatric and neonatal settings where compliance, ethical and physiological concerns limit large volumes drawing. Further studies are needed to confirm these results by collecting blood with Mitra® after finger or heel prick.

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