
Oral

[O25-1] O25-1: Biomarkers for transplantation

Chairs: Mercè Brunet, Spain / Hirofumi Jono, Japan

Mon. Sep 25, 2017 1:30 PM - 2:30 PM Main Hall (1F)

(Mon. Sep 25, 2017 1:30 PM - 2:30 PM Main Hall)

[O25-1-2] Combined measurement of immunosuppressive agents, creatinine and hematocrit in a single dried blood spot using LC-MSMS and near-infra-red spectrometry

Erik van Maarseveen¹, Annelies Egas², Hanneke Kwakkel-van Erp³, Marion Wessels-Bakker⁴, Mohsin El Amrani⁵, Marlies Oostendorp⁶ (1.University Medical Center Utrecht, 2.University Medical Center Utrecht, 3.University Medical Center Utrecht, 4.University Medical Center Utrecht, 5.University Medical Center Utrecht, 6.University Medical Center Utrecht)

Keywords: immunosuppressive agents, creatinine, hematocrit, dried blood spot, transplantation

Background

Biomarker and drug monitoring are essential to diagnose and prevent toxicity and rejection in lung transplant recipients. To date, whole blood sampling is 'the golden standard' for quantification of drugs and biomarkers in either whole blood or serum. Nevertheless, whole blood sampling in stable transplant recipients usually takes place at the outpatient clinic and is rarely carried out by patients themselves at home. Therefore, we have developed a practical method for rapid and easy quantification of hematocrit (Ht), creatinine (Creat) and immunosuppressive agents (IMx) in dried blood spot (DBS) samples.

Methods

For Ht measurement near-infrared (NIR) spectrometry combined with an in-house developed NIR-model and Büchi NIRcal 5.5 software were used to nondestructively quantitate Ht in DBS. Thereafter, DBS samples were extracted under ultrasonication for 15 minutes. IMx and Creat were quantified with a Thermo Scientific triple quadrupole Quantum Access with positive ionization. Following analytical validation methods were clinically validated by comparing DBS results with whole blood and serum reference methods. Venous whole blood samples of 30 patients on cyclosporin A, tacrolimus, sirolimus and everolimus were used to prepare DBS. Ht, IMx and Creat concentrations determined by DBS and whole blood or serum methods were compared by Passing & Bablok regression analysis.

Results

Low, medium and high controls were <15% in all instances. A good correlation was demonstrated between DBS and reference methods yielding linear regression coefficients of $R^2 > 0.95$ for all compounds and Ht. The average concentrations of Ht, IMx and Creat in the population were within the 95% limits of agreement.

Conclusions

A rapid and combined dried blood spot analysis suitable for patient home monitoring of immunosuppressive agents, creatinine and hematocrit in lung transplant recipients using a single sample was successfully developed.