Poster

[P27-7] P27-7: Assay

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[P27-7-10] Fully automated LC-MS/MS platform for drugs quantitation in serum samples

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Background

Nowadays the therapeutic drug monitoring of drugs such as Antiepileptics, Antidepressant, Neuroleptics and Benzodiazepines needs to be accomplished by extremely accurate techniques. Liquid chromatography coupled to tandem mass spectrometry (LC–MS/MS) shows high sensitivity and specificity compared to the traditional quantitation techniques. Nevertheless, LC-MS/MS approaches mostly lack standardization and the necessary throughput for the application in routine analysis. We report a fully automated platform for the quantitation of more than 100 molecules in serum samples with high throughput and no need for manual sample preparation performed by the operator.

Methods

The analysis of Antiepileptic/Antidepressant/Neuroleptics/Benzodiazepines drugs was performed using a fully automatic LCMS preparation Unit (CLAM-2000, “For Research Use Only. Not for use in clinical diagnostics.” Shimadzu) online with a LCMS system (NexeraX2-LCMS8060, Shimadzu) starting from serum samples using the “ClinMass® TDM Kit System” (Recipe, MS9200). For all different panels of molecules (Antiepileptic/Antidepressant/Neuroleptics/Benzodiazepines) the chromatographic separation was performed in 6-10 min.

Results

The quantitation of 116 Molecules (28 different Neuroleptics, 26 Antiepileptics 35 Benzodiazepines, 27 Antidepressant) in serum samples was performed by LC-MS/MS analysis. We completely eliminated the involvement of the operator for sample preparation by the use of a novel automatic preparation unit (CLAM-2000, Shimadzu). The fully automatic preparation/analysis procedure was as follows: I) 20 ul of methanol were dispensed in a filtration-collection vial; II) 30 ul of serum sample were added; III) 60 ul of IS mix were added (protein precipitation); IV) stirring/incubation (1 min); V) Filtration for 1 min (deproteinization); the sample was finally transferred to the LCMS system without human intervention from the CLAM-2000. The linearity range and the repeatability of the method were compatible with suggested therapeutic intervals for all drugs panels and in accordance with CLSI guidelines using a wide range of quantification for all the compounds (Recipe ClinChek® serum control).

Conclusions

The completely automated quantification method for Antiepileptics, Antidepressant, Benzodiazepines and Neuroleptics allow routine analysis of serum samples , with high data quality/precision, reduced time, increased throughput and safety.