

Patient self-collected versus nurse-collected fingerprick volumetric absorptive microsampling for antiseizure medication therapeutic monitoring

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Background: Volumetric absorptive microsampling (VAMS - Mitra®, Neoteryx) is increasingly proposed as a clinically reliable sampling methodology for therapeutic drug monitoring (TDM) and used as a telemedicine (TM) tool. The study's aim was to establish the feasibility of patient self-collected VAMS. Patient self-collected and nurse-collected VAMS were compared. Plasma ASMs concentrations from venous blood were used as a reference standard to compare blood concentrations found in VAMS.

Methods: Persons with epilepsy (PwE) on chronic steady-state ASMs were enrolled in this prospective single-center study. Morning venous and capillary blood by VAMS were collected by nurses. Afterward, patients performed VAMS collection by themselves. ASM blood and plasma concentration analyses were performed by ultra-high liquid chromatography-mass spectrometry (2,3,4). ASMs blood concentrations from nurse-collected VAMS were compared to plasma concentrations by linear regression analysis. A cross-validation study was performed comparing ASMs concentrations obtained by nurse-collected versus patient-self-collected VAMS samples.

Results: 301 PwE (173 females, mean age: 44.33±16.10 years) treated with several ASMs (n=13), were enrolled providing a total of 456 ASMs concentration measurements. Linear correlation analyses between ASMs plasma and blood nurse-collected VAMS showed results in line with the reported literature. Cross-validation analysis between nurse-collected vs patient self-collected VAMS showed a bias within ±20% for more than 78% of intrasubject ASMs determinations. Bland–Altman test was used to assess the relative differences. It showed good results for all drugs. Furthermore, were compared the results obtained from VAMS collected by nurses and patients self-collected with Passing–Bablok regression. Most analytes showed a linear correlation with a slope around 1 and an intercept around 0.

Conclusions: To our knowledge, this is the first study considering the real-world application of patient self-collected VAMS for ASMs TM. Furthermore, concentration from self-collected-VAMS has proved comparable with those from nurse-collected, demonstrating that patients' self-sampling can be feasible after minimal training. Results give a promising basis for at-home VAMS applications. This VAMS-based method could be considered useful for TM, giving a promising basis for future at-home monitoring.

References:

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