Poster Abstracts

PO-30

RAPID DRUG SCREENING FOR USE IN EMERGENCY MEDICAL TREATMENT

Kiyotaka Usui [1], Koichi Saito [2], Tetsuo Kokaji [3], Tomomi Aramaki [1], Masato Funayama [1]

[1] Forensic Medicine, Tohoku University Graduate School of Medicine, Japan, [2] Forensic Science Laboratory, Miyagi Prefectural Police, Japan, [3] SCIEX, Japan

Objectives: We addressed the development of a new reliable drug screening method which completes within 10 min using a combination of the modified QuEChERS (Quick, Easy, Cheap, Effective, Rugged, Safe) method and an FI-MS/MS (Flow injectio -tandem mass spectrometry).

Methods: Whole blood samples were collected from practical forensic cases (N=120) and pretreated using the QuEChERS method. Briefly, 0.5 mL of whole blood was diluted 3-fold with distilled water. The diluted sample was placed in a plastic tube with 0.5 g of the pre-packed extraction kit reagent, a stainless steel bead, and 1 mL of acetonitrile. The mixture was shaken for 30 s and centrifuged for 1 min. The supernatant was transferred to a 2.0 mL centrifuge tube containing the solid-phase extraction sorbent for sample cleanup. The tube was mixed for 10 s and centrifuged for 1 min. The extract was analyzed by both LC-MS/MS and FI-MS/MS (analysis time = 1.5 min). All product ion spectra obtained by FI-MS/MS were automatically processed by Library View software, and the results were compared with those of the LC-MS/MS analysis using Dice's coefficient.

Results: The modified QuEChERS method took about 5 min for extraction and FI-MS/MS analysis needed only 1.5 min per sample (No column equilibration required). Therefore, a sequence of analytical procedures, from the pretreatment of whole blood to the reporting of results can be completed within 10 min. For actual forensic cases (N=120), the qualitative results roughly matched (96% concordance rate) with the results obtained with the standard LC-MS/MS technique.

Conclusion: The combination of QuEChERS and FI-MS/MS enabled us to complete the entire drug screening process, from the start-up of the instruments through the extraction process and data analysis, within 10 min.