G107 Evaluation of the Randox Whole Blood Drugs of Abuse (DOA) Microchip Arrays for Use With Alternative Postmortem Samples as a Rapid Near-Body Screen

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The goal of this presentation is to illustrate a rapid and simple tissue preparation method which allows drugs of abuse (DOA) to be screened using the Randox whole blood DOA microchip arrays.

This presentation will impact the forensic science community as the entire process can be undertaken and results obtained in the mortuary whilst the postmortem is taking place. Also the quantity of sample needed to screen may obviate the need to remove large tissue samples for laboratory analysis, saving time and costs, especially in negative cases.

A procedure is described that allows small aliquots of postmortem samples of blood, urine, vitreous humor, liver, and psoas major muscle to be analyzed for the following drugs, simultaneously: acetaminophen, amphetamine, barbiturates, benzodiazepines, benzoylecgonine, buprenorphine, cannabinoids, fentanyl, ketamine, lysergic acid diethylamide (LSD), methadone, methaqualone, methylamfetamine, methylenedioxymethamfetamine (MDMA), opioids, phencyclidine (PCP), propoxyphene, tricyclic antidepressants, zaleplon, zolpidem, and zopiclone.

Femoral blood, urine, vitreous humor, liver, and psoas muscle were obtained from forensic autopsies, ranging from suicides to natural causes. Tissue samples were cut into 1 centimeter cubes and homogenised with 1 millilitre SPE diluent. The homogenates were centrifuged for ten minutes at 3000 rpm and 70 microlitres of supernatant transferred to Eppendorf tubes. The samples were then diluted 1:3 with SPE diluent. Femoral blood, urine and vitreous humour were prepared and applied to the assay following the manufacturer's protocol for whole blood. Femoral blood from each case subsequently underwent confirmatory analysis using high performance liquid chromatography with diode array detection (HPLC-DAD) and liquid chromatography tandem mass spectrometry (LC-MS/MS).

Over 100 postmortems were screened for a combination of the previously mentioned drugs of abuse. A good agreement was obtained between the Randox assays and HPLC-DAD and LC-MS/MS analyses. Of the positive cases, urine and liver samples had a greater percentage agreement with confirmatory analyses than femoral blood, vitreous humor, and psoas muscle. The discrepancies between assay screening and confirmatory analysis may reflect differences in drug distribution between tissues as well as confirmatory analyses detecting concentrations below the assay's cut-offs.

In conclusion, the Randox whole blood DOA arrays can be used to alternative postmortem samples rapidly and simply. The simple procedure will benefit the forensic community as the entire process can be undertaken and results obtained in the mortuary while the postmortem is taking place. Also the quantity of sample needed to screen may obviate the need to remove large tissue samples for laboratory analysis, saving time and costs, especially in negative cases.

Drug Sceening, Postmortem, Alternative Samples

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