K28 Determination of Zolpidem and Glyphosate in Blood From Emergency Room (ER) Patients

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After attending this presentation, attendees will be aware of the drugs and chemicals detected in ERs in Korea and the relationship between the blood level of the zolpidem and glyphosate and their symptoms in 15 zolpidem- and 6 glyphosate-positive cases.

This presentation will impact the forensic science community by showing how important it is to establish the screening method to identify the toxicants at ERs for proper treatment.

When intoxicated individuals are admitted to the ER, it is important to identify levels of intoxication and potential toxicants. Due to the absence of systematic analytical methods used in the ER at hospitals in South Korea, it is necessary to establish fast and accurate screening methods that can be readily used in the ER. In addition, it is important to evaluate the relationship between blood levels of potential toxicants and symptoms for the proper treatment of patients. The objectives of this study are: (1) to establish screening methods for identifying the chemicals in blood samples from patients; and, (2) to predict the clinical symptoms by comparing the relationship between blood levels of chemicals and clinical outcomes.

In this study, blood samples were collected from 80 patients who were admitted to Chungnam National University Hospital. Analytes of interest were isolated from each blood sample using Solid-Phase Extraction (SPE). These extracted samples were then analyzed using Gas Chromatography/Mass Spectrometry (GC/MS) and Liquid Chromatography/Mass Spectrometry (LC/MS). Method validation was performed for the most commonly encountered compounds (zolpidem and glyphosate), including linearity, Limit Of Detection (LOD), Limit Of Quantitation (LOQ), intra- and inter-day precision, and accuracy. Clinical symptoms and Glasgow Coma Scale (GCS) scores were also recorded at the ER. Measured GCS scores ranged from 3 (full coma state) to 15 (full alert).

As a summary of results, a variety of compounds were identified from the 80 blood samples analyzed in this study, including zolpidem (*n*=15), diphenhydramine (*n*=9), tramadol (*n*=8), acetaminophen (*n*=8), chlorpheniramine (*n*=6), quetiapine (*n*=5), glyphosate (*n*=5), and imipramine (*n*=3). Blood levels of zolpidem in 15 cases and glyphosate in 5 cases ranged from 19.6ng/mL to 3,605.8ng/mL and from 24.3ng/mL to 165.4 ng/mL, respectively. The mental state of patients intoxicated with these two compounds was alert to semi-coma with GCS scores of 3 (eye 1, verbal 1, motor 1) to 15 (eye 4, verbal 5, motor 6).

In conclusion, it is demonstrated that blood levels of zolpidem and glyphosate were well correlated with clinical symptoms and GCS scores from patients. Therefore, developed methods using GC/MS and LC/MS with SPE can be utilized as screening tools to determine the level of intoxication and type of toxicants. In addition, the evaluated information will be useful for clinical toxicologists in order to provide the appropriate treatment of patients in the ER.

ER Patient, Zolpidem, Glyphosate