K48 A Flualprazolam Study on Postmortem Samples

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Learning Overview: The goal of this presentation is to provide additional reference data on flualprazolam, a new synthetic benzodiazepine, in postmortem blood, urine, and tissues.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by informing attendees that the importance of evaluating flualprazolam on collected postmortem samples may provide an understanding in the distribution of this benzodiazepine in multiple postmortem matrices.

Benzodiazepines are commonly used for their sedative effects by increasing the level of the inhibitory neurotransmitter Gamma-Aminobutyric Acid (GABA) in the brain. These sedative effects are important to consider when interpreting postmortem cases. In recent years, many Novel Psychoactive Substances (NPS) have become popular, particularly flualprazolam for NPS benzodiazepines. Flualprazolam has a similar structure and presumed similar effects as alprazolam. Due to the lack of analysis and quantification of flualprazolam in many toxicology laboratories until recently, not many postmortem reference concentrations can be currently found. At the Orange County Crime Lab in California, the drug prevalence of flualprazolam drastically increased in the past three years. Postmortem heart blood, vitreous humor, liver homogenate, brain homogenate, gastric contents homogenate, and urine samples were selected to be quantitated after positive results from screening in the heart blood. A validated quantification method for flualprazolam from 4–256ng/mL by DPX WAX-S tips on a liquid chromatography/tandem mass spectrometry was used to analyze all samples. The method validation followed the Scientific Working Group for Forensic Toxicology (SWGTOX) and American National Standards Institute/Academy Standards Board (ANSI/ASB) method validation documents, including calibration model, stability, ion suppression/enhancement, bias and precision, limit of detection, limit of quantification, and dilution integrity. A total of 36 central blood samples were analyzed with 22 samples having a flualprazolam concentration between 4.24–48.03ng/mL, with an average of 16.33ng/mL and a median of 9.95ng/mL. Of those 36 cases, not all tissues could be acquired. The total number and average for each sample type is: urine—21 samples with an average of 14.36ng/mL un-conjugated flualprazolam; vitreous humor—22 samples with an average of 7.70ng/mL; brain homogenate—23 samples with an average of 23.23ng/g; liver homogenate—23 samples with an average of 50.71ng/g; and 22 samples of gastric contents homogenate with an average of 0.33mg.

From this study, the flualprazolam concentrations in the central blood and tissues appear lower than those seen in cases containing alprazolam. Flualprazolam does not appear to absorb into vitreous humor well as it was only present at detectable levels in 5 of the 22 cases. Of the 34 cases where a cause of death had already been decided by the medical examiner, 13 contained flualprazolam as a contributing factor. A continuation of concentration must be collected and reported. The availability of multiple matrices will aid in the understanding of drug distribution within the body.

Flualprazolam, Benzodiazepine, Postmortem

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