K62 A Case Report: Driving Under the Influence (DUI) of Flubromazepam

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Learning Overview: After attending this presentation, attendees will be aware of the impairment effects demonstrated by an individual DUI of a benzodiazepine Novel Psychoactive Substance (NPS).

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing quantitative data from a single drug intoxication case that may assist toxicologists in future casework interpretation.

Benzodiazepines are a commonly prescribed class of drugs used to treat anxiety, seizures, and sleep disorders. Several decades ago, investigators synthesized a number of benzodiazepines as potential new treatment options. More recently, these substances have reemerged for sale on the internet as legal highs. Flubromazepam was first developed and patented in the 1960s and reappeared on the internet marketplace in 2012. Currently, few reports are available from single drug intoxications involving flubromazepam.

Case History: Police were notified of a vehicle driving erratically and swerving between lanes. The 23-year-old male driver was stopped after his vehicle hit a curb. The individual was unable to hold a steady conversation and had difficulty comprehending the questions asked by the officer. The officer administered Standardized Field Sobriety Tests (SFSTs) and observed indicators for lack of smooth pursuit in both eyes on the Horizontal Gaze Nystagmus (HGN) test and six clues on the Walk And Turn (WAT), including inability to maintain balance during the instruction phase, started too soon, missed heel-to-toe, raised arms, incorrect number of steps, and improper turn. No additional SFSTs were conducted due to the observations made during the HGN and WAT. An officer initiated a search of the vehicle and discovered empty prescription bottles of sertraline and oxycodone, a small bag of blue pills, a small bag containing traces of a white powder, and white powder located in the compartment above the gearshift. The individual threw himself to the ground while he was being detained and was injured. At that time, he was transported to a medical facility where blood was drawn and submitted to the Armed Forces Medical Examiner System Division of Forensic Toxicology.

Routine toxicological analyses included ethanol and additional volatiles, drugs of abuse immunoassay, and an alkaline-extractable drug screen. Blood volatiles were analyzed by headspace Gas Chromatography/Flame Ionization Detector (GC/FID). Immunoassays were performed for amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, opioids, phencyclidine, and sympathomimetic amines. Alkaline drugs were extracted with a mixed-mode solid phase extraction procedure and analyzed by Gas Chromatography/Mass Spectrometry (GC/MS) in full-scan mode. Identification criteria included retention time within ±2% of the analyte in the control standard and a full-scan mass spectrum matching a reference spectrum with at least 70% confidence. Subsequent confirmation was conducted with a validated method for liquid-liquid extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) analysis. Two Multiple Reaction Monitorings (MRMs) were monitored for all analytes and deuterated internal standards. Qualitative identification was dependent on meeting MRM ratio, peak shape, and retention time criteria. Quantitative criteria included control bias within 20% of target and calibration curves with $r^2 \geq 0.99$.

The blood was negative for ethanol but was presumptively positive for benzodiazepines by immunoassay. An alkaline drug screen narrowed the benzodiazepine presumptive positive to flubromazepam with a 76% spectral library match. Confirmatory analysis revealed that the blood contained flubromazepam at 546ng/mL.

This study presents a DUID case where flubromazepam was the only substance identified in the blood. In addition to the erratic driving behavior, the individual displayed two clues on the HGN and six of eight clues on the WAT. Video evidence also showed the individual stumbling and hitting walls as he left his room 20min prior to the DUI incident. Lack of smooth pursuit, impaired divided attention, and other central nervous system depressant outcomes observed in this individual were similar to effects elicited by traditional benzodiazepines.

DUID, Flubromazepam, NPS