K39 Postmortem Distribution of 25I-NBOMe After Acute Fatal Toxicity

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After attending this presentation, attendees will learn about the postmortem tissue distribution of 25I-NBOMe in two fatal cases of acute toxicity. The research compound 25I-NBOMe, also known as Cimbi-5 or INBMeO, was developed in academic laboratories as a potent serotonin 2A receptor agonist. Because of its high affinity and ambiguous legal status, recreational drug enthusiasts have sought this compound as a powerful alternative to other hallucinogenic drugs such as lysergic acid diethylamide, or LSD.

This presentation impacts the forensic science community by showing the first forensic characterization of fatalities attributed solely to the toxic effects of 25I-NBOMe. Comprehensive toxicology screens in both cases returned evidence of marijuana use only. A deeper analysis using time-of-flight mass spectrometry revealed the presence of 25I-NBOMe, which was further confirmed by tandem mass spectrometry. The behavior and injuries in these cases reveal a consistent pattern preceding fatal 25I-NBOMe toxicity.

This presentation reports on two deaths following 25I-NBOMe ingestion by decedents who attended separate “rave” parties. Case 1 involved a 21-year-old male who had admitted taking “acid” to his friend. A sudden violent rage caused him to flail about, and subsequently became unresponsive. The postmortem examination revealed numerous external injuries that were consistent with physical aggression. Case 2 involved a 15-year-old female who was socializing outside a rave party, became ill, and rapidly deteriorated as her friend transported her to the hospital. The postmortem assessment was similar to the first case, in which external contusions were featured prominently. Yet, no anatomical cause of death was found in the internal examination.

Measurements of 25I-NBOMe were accomplished by Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). In this assay, a liquid-liquid extraction consisting of ethyl acetate was performed on whole blood, stomach contents, liver, bile, brain, vitreous humor, and urine specimens in comparison to 25I-NBOMe-D3 as a deuterated internal standard. After vortexing and centrifugation, the organic layer was collected and acidified, then evaporated with compressed nitrogen until a dry residue remained. The extract was resuspended in mobile phase buffer suitable for analytical injection. The results are shown in the provided table.

Vitreous humor returned the lowest levels, likely due to lack of distribution during rapid toxicity and a large volume of distribution for 25I-NBOMe. Whole blood, stomach contents, and urine gave acceptable responses, whereas brain and bile were superior specimens, presumably because of their inherently lipid-rich compositions. Because of this property, it is worth noting that brain would seemingly be the best choice for postmortem toxicology analysis, especially under the circumstances of a delayed hospital death.

Without well-characterized scenes and events, these injuries could be perceived as consistent with physical assault resulting in homicide. However, in both cases the internal examination revealed superficial, nonfatal injuries. These findings in the context of the scene characterizations, external body examinations, forensic autopsies, and comprehensive toxicology analyses underscore the necessity of a thorough investigation. Among other 5-HT2A receptor agonists, 25I-NBOMe is not necessarily the most potent since other iterations have been refined through computer simulations and binding activation experiments. New derivatives have been synthesized by replacing the iodine moiety or by substituting the methoxybenzyl ligand on the opposite end of the molecule. Considering these trends, this study anticipates the emergence of many new synthetic derivatives in the near future. For those investigating deaths involving the use of recreational designer drugs, it will be necessary to maintain a level of suspicion that rivals the creativity of those who fabricate these exotic drugs.

2C-I-NBOMe, Designer Drug, Postmortem Distribution

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