K34 Updated Trends and Case Studies in the Lysergic Acid Diethylamide (LSD) Revival

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Learning Overview: After attending this presentation, attendees will be familiar with the prevalence and investigative context of LSD in human performance and postmortem casework.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by raising awareness of ongoing LSD trends and the case details that may indicate hallucinogenic drug usage.

Introduction: LSD emerged in the 1960s and lured recreational drug users with its psychedelic and hallucinogenic effects. Its popularity diminished in the following years and remained low for decades. Over the past several years, a revival has taken place and introduced higher potency analogs. Since 2015, the laboratory has witnessed this revival firsthand and reported new case positives for LSD and/or the primary metabolite, 2-oxo-3-hydroxy-LSD, in both blood and urine specimens.

Methods: Blood and/or urine specimens for human performance or postmortem casework were screened by an LSD immunoassay kit with a limit of detection of 0.5ng/mL. All positive screens were analyzed on a Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) confirmatory method for LSD and its primary metabolite, 2-oxo-3-hydroxy LSD, with linear ranges from 0.05ng/mL to 2.0ng/mL and 0.25ng/mL to 10.0ng/mL, respectively.

Results: LSD-positive toxicology cases have been detected in nearly half of the states throughout the country, with the Southeast and Western regions appearing to be the most affected. While most of the cases involve some form of public intoxication, LSD has also been observed as a significant contributor in sexual assault and postmortem cases. Similar to designer benzodiazepines, immunoassays can be a useful tool for detecting emerging LSD analogs. Some analogs such as ALD-52, 1B-LSD, or 1P-LSD yielded presumptive positive results at concentrations as low as 1.0ng/mL whereas AL-LAD, ETH-LAD, and LSZ were observed to have little to no cross-reactivity on the in-house immunoassay, which would lead to possible false-negative casework through this method.

Conclusions: While LSD screening may not be warranted in routine panels, case histories can prove especially useful for determining which cases should proceed to screening for LSD or other hallucinogens. When reviewing the history, patient behavior or activities may suggest what type of drug may have been ingested. At a minimum, laboratories should have a validated screening panel for LSD and 2-oxo-3-hydroxy LSD to test casework with suspected hallucinogenic drug use. This can be accomplished using immunoassays, LC/MS/MS, or time-of-flight mass spectrometry. Since not all analogs will cross-react on the immunoassay, it is recommended to utilize a supplemental screen for cases with indicative case histories that confirmed negative for LSD and associated metabolites. As the popularity of LSD and its analogs continue to rise, it is important that labs ensure their testing methods are comprehensive and include LSD and similar compounds. Failure to implement appropriate testing for LSD may result in missed confirmations and reporting cases as falsely negative.

LSD, NPS, Trends

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