



E1 Difficulties in the Interpretation of Postmortem Concentrations of Synthetic Cannabinoids

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After attending this presentation, attendees will better understand the increasing use of Synthetic Cannabinoids (SCs), how to evaluate their presence in fatal intoxications, and references of blood concentrations for one substance — MMB-CHMINACA.

This presentation will impact the forensic science community by increasing knowledge regarding how to evaluate the presence of SCs in fatal intoxications by providing results from 49 autopsies categorized to be related to an SC.

SCs were introduced on the drug market in the early 2000s as a “safe and legal” alternative to cannabis and were sold in ready-to-use plastic bags with herbs for smoking. Recently, serious adverse effects, including deaths, from the use of SCs have been reported. Possible explanations for the deaths are inexperienced users, the high potency compared to cannabis, and the sale of pure compounds in large containers. Only very limited information is presented in the literature regarding toxic levels of SCs and most of the different SCs have not previously been reported at all.¹ The goal of this study was to enlighten the toxicology of SCs through analyses of SC-positive cases. The autopsy findings and circumstances in each case were scrutinized and are presented with postmortem femoral blood concentrations of one of the more prevalent SCs, MMB-CHMINACA.

Materials and Methods: Data from medicolegal autopsies in Sweden from 2010 through March 2015 (N =approximately 23,100 cases) where SCs were present in blood were reviewed regarding geographical spread, age, sex, cause of death, place of death, and autopsy/toxicology findings. The cases were categorized according to the cause of death by applying a modified version of the strategy proposed by Druid and Holmgren: (1) death due to intoxication of SCs alone (no other drugs detected) or otherwise directly related to intake of SCs; (2) death due to intoxication by SCs *and* other drug(s), and/or alcohol; or, (3) other cause of death not related to the presence of SCs.²

Data comparisons were made between levels of MMB-CHMINACA in autopsies and living controls (concentrations detected in suspected drugged drivers).

Results: Forty-nine cases were included of which 92% were male and the median age was 29.7 (range 16 years-59 years). Most decedents were found dead at home. A full autopsy, including histology (90%) and a comprehensive toxicological screening for drugs and medication (100%), was performed, including screening for 50-100 SCs depending on the year. In 41 cases, the cause of death was intoxication and/or related to drug abuse. A total of 24 different SCs were found, with the most prevalent being THJ-018. Preliminary classification resulted in 5 cases in group A, 19 cases in group B, and 25 cases in group C. The forensic pathologist often phrased the death certificate with a low degree of certainty, such as “the death may be caused by...” All but five cases had other drugs present in femoral blood and many had opioids like methadone present, indicating that many victims were experienced drug users. The concentrations of MMB-CHMINACA in femoral blood were comparable to those recorded in living controls.

A Typical Case Report: An 18-year-old man with a multi-substance drug abuse history visited a party, became unresponsive, and was pronounced dead in the emergency room. Toxicological analyses detected nothing but MMB-CHMINACA at a concentration of 0.003 microgram/gram femoral blood. The medicolegal autopsy revealed no other findings that could explain the death.

Discussion and Conclusions: The toxicity of SCs is largely unknown with little data to rely on, implying a risk of misinterpretation of SC intoxications. More results from living controls are needed to enable more reliable judgments regarding toxic and fatal concentrations.

Reference(s):

1. Behonick G., Shanks K.G., Firchau D.J., et al. Four postmortem case reports with quantitative detection of the synthetic cannabinoid. *J Anal Toxicol* 2014;38:559-562.
2. Druid D., Holmgren P. A compilation of fatal and control concentrations of drugs in postmortem femoral blood. *J Forensic Sci* 1997;42:79-87.

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