



K50 Sleep-Driving Is a Nightmare: Driving Under the Influence of Zolpidem Cases in Colorado

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The goal of this presentation is to assist attendees in identifying signs and symptoms of zolpidem impairment and evaluate whether the zolpidem levels correlate with observed impairment, based on a study of all zolpidem-positive cases from July 2009 to July 2014 which were tested by ChemaTox Laboratory. The study focused on identifying the following: behaviors that appear in multiple reports, the most frequent multiple-drug intoxication combinations with zolpidem, and the concentrations of zolpidem in both single- and multiple-drug intoxication cases. Selected cases are examined in detail to highlight specific traits.

This presentation will impact the forensic science community by informing attendees that if a laboratory is not looking for zolpidem in their routine testing, it is likely missing these cases. Relying on law enforcement to request zolpidem testing is not sufficient to detect many of these cases, as people often do not inform officers they are taking zolpidem. The popularity of zolpidem, along with the sensationalized publicity surrounding the possible side effects, have led to common themes in cases. These themes include involuntary driving/intoxication, sleep driving, tolerance to the drug effects, and residual levels from the night before. All of these possible issues should still be considered; however, knowing and understanding the common features of these cases and the available research on the topic are critical for the most accurate evaluation of a case. It is imperative that the forensic science community and the public be educated about the dangers associated with driving under the influence of zolpidem.

Introduction: Zolpidem, commonly known as Ambien®, is a z-drug. Z-drugs comprise a class of non-benzodiazepine sedative-hypnotics typically prescribed for the treatment of insomnia. Zolpidem has a relatively short half-life of 2-5 hours and is rapidly eliminated. Zolpidem is intended to be taken immediately prior to going to sleep when the individual taking it is able to devote eight full hours to resting. Incidents of individuals driving under the influence of zolpidem, often to a substantially impaired degree, are becoming more frequent. In the past few years, the proportion of zolpidem-involved Driving Under the Influence of Drugs (DUID) cases tested by ChemaTox has increased. In 2011, zolpidem was the sixth most common drug/drug class in DUID cases tested by ChemaTox; by 2013, it had become the fourth most common drug. The zolpidem medication guide infamously cautions the user against “sleep-driving.” Concern about potential residual levels recently led the FDA to significantly decrease its dosage guidelines. Although more research and education have been provided in the forensic community, the most typical defense used in DUID-zolpidem cases in Colorado is that of involuntary intoxication. Of the cases submitted to ChemaTox, incidence of true involuntary intoxication is rare. Although individuals suspected of DUID-zolpidem often experience confusion, blood levels within expected therapeutic range, and lack of memory of the incident, this does not negate individual responsibility. Analysis was conducted of several typical and remarkable zolpidem-involved cases undertaken by ChemaTox within the years 2009-2014.

Objective: To identify signs and symptoms of zolpidem impairment and evaluate whether zolpidem levels correlate with observed impairment in all zolpidem-positive cases received by ChemaTox between July 2009 and July 2014. The study focuses on identifying the following: behaviors that appear in multiple reports, the most frequent polydrug intoxication combinations with zolpidem, and the concentrations of zolpidem in both single drug and polydrug intoxication cases. Selected cases are examined in detail to highlight specific traits.

Methods: Zolpidem-positive blood samples from DUID cases submitted to ChemaTox within the timeframe studied were evaluated. Samples were screened via Enzyme-Linked Immunosorbent Assay (ELISA). Confirmation testing was performed via Gas Chromatography/Mass Spectrometry (GC/MS) or Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), both with limits of detection of 20ng/mL and limits of quantitation of 50 g/mL for zolpidem. Samples were tested via ELISA and GC/MS or LC/MS/MS for any other requested drugs. Law enforcement case reports are not routinely provided to the laboratory. Reports were requested for all cases and, when available, were analyzed for documented indicia of impairment, subject demographics, and whether zolpidem or other drug use was admitted by the subject.



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Results: In DUID cases undertaken by ChemaTox between 2009 and 2014, the most common drugs/drug classes detected were, in descending order, D-9-tetrahydrocannabinol, benzodiazepines, amphetamines, zolpidem, opiates, cocaine, oxycodone, and tramadol. Zolpidem was confirmed in 203 cases (concentration range: <50ng/mL-2,400ng/mL). In available police reports, documented indicia of impairment included erratic weaving and lane travel, “ping-ponging” or colliding with multiple stationary objects, difficulty keeping eyes open, hallucinations, poor memory of recent events, difficulty following instructions and answering questions, and poor reaction time.

Conclusion/Discussion: If a laboratory does not routinely test for zolpidem, it is likely failing to detect impairment in zolpidem-involved cases. Relying on law enforcement to request zolpidem testing is not sufficient as subjects frequently do not inform officers that they are taking zolpidem. The popularity of zolpidem along with sensationalized publicity surrounding the possible side effects have led to trending defense strategies, including involuntary driving/intoxication, sleep driving, tolerance to drug effects, and residual concentrations. All of these potential explanations should be considered; however, familiarity with common themes of these cases and available research are critical for accurate case evaluation. It is imperative that the forensic community and the public be educated about the dangers associated with driving under the influence of zolpidem.

Zolpidem, DUID, Driving Impairment