The Detection of Propofol Glucuronide in Human Hair Using LC-MS/MS: Case Study and Survey of High-Risk Health Professionals

J. Jones, M. Jones, C. Plate, D. Lewis
United States Drug Testing Laboratories, Des Plaines, Illinois USA

Background

Despite initiatives to increase awareness, alcohol Propofol (2,6-disopropophenol) is a commonly used agent for general anesthesia because of its short duration, quick recovery time, and minimal side effects [1]. Although not a controlled substance in the United States, propofol abuse and misuse by medical professionals has increased 5-fold between 1997 and 2011 [1]. Propofol detection in biological fluids has a very short detection window and the presence of propofol in hair does not distinguish between ingestion and environmental exposure. A metabolite, propofol glucuronide, is formed in the liver and may be detected in the hair [2].

![Propofol and Propofol Glucuronide]

Objective

The purpose of this study is to validate a method for the detection of propofol glucuronide in hair and apply this method to a case study and a survey of high-risk health professionals.

10-yr incidence of propofol abuse is up 5-fold at academic anesthesiology programs (1)

Results from Authentic Specimens

Comparison with Other Findings

- Median = 312 pg/mg

A survey of 300 medical professionals that were participating in an addiction treatment program were subjected to the method. Two specimens contained detectable amounts of PPFG, with one just below the LOQ at 7 pg/mg and one at 108 pg/mg. These findings are compared to the findings of 7 suspected propofol abusers reported by Kim et al. [2] and charted above.

An authentic hair specimen from a 50 year old women anesthetized for 15 minutes with propofol did not contain detectable PPFG

Conclusions

This method demonstrated sufficient precision, accuracy and robustness with an analytical measurement range between 8 pg/mg and 100 pg/mg. While being sensitive enough to identify two individuals in a survey of high-risk substance abuse treatment participants, the method was not able to identify propofol metabolite in the hair of a woman receiving a routine quantity of propofol administered during a short surgical procedure. This method provides substance abuse treatment professionals with another objective tool to identify propofol abusers.

Acknowledgements

This project was funded internally by USDTL.

References: