USDTL News

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Lack of monitoring, treatment raises concerns over propofol abuse

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As the root cause of pop-star Michael Jackson's death, the anesthetic propofol is now widely recognized as having abuse potential, particularly among healthcare practitioners such as surgeons, anesthesiologists, nurse anesthetists and operating room technicians. However, monitoring and treatment for propofol abuse are still missing from the majority of anesthesiology programs.

Propofol, also known as Diprivan®, reduces anxiety and tension, promotes sleep or loss of consciousness and awareness for short diagnostic and surgical procedures and supplements other general anesthetics. Propofol's abuse potential is relatively high, as it is not classified as a controlled substance and is readily available in hospital operating rooms, emergency rooms, doctors' offices and emergency treatment vehicles.

In 2007, Wischmeyer, et al., surveyed 126 academic anesthesiology training programs in the United States. One or more instances of propofol abuse in the preceding 10 years were reported by 18 percent of the departments; the observed incidence of propofol abuse was 10 per 10,000 anesthesia providers per decade, a five-fold increase from previous surveys of propofol abuse. Of the reported propofol abusers, 28 percent died as a consequence of propofol abuse. Almost 86 percent of those who died were residents.

The biggest concern for healthcare practitioners is the lack of treatment for those abusing propofol. Wischmeyer reported 71 percent of the anesthesiology programs had no monitoring system for propofol.

Propofol's time of action is very short, resulting in loss of consciousness within 40 seconds of injection. Its duration of action is also short, with a mean of three minutes to five minutes following a dose of 2 milligrams to 2.5 milligrams per kilogram of body weight. Patients injected with propofol are reported to wake up in an elated or euphoric state. Many propofol abusers have become addicted by using propofol to overcome persistent insomnia, often brought on by a history of psychological or physical trauma. Because of its short duration of action, propofol abusers may inject it as many as 50 times to 100 times in one sitting. Deaths occur among abusers due to the very narrow therapeutic window–even a small quantity of propofol over the standard dose can trigger fatal respiratory arrest.

Monitoring propofol levels in humans is very difficult due to rapid metabolism of the parent compound. However, testing urine for the propofol glucuronide metabolite is advantageous because the metabolite provides a longer detection window than its parent, propofol. Propofol is rapidly metabolized in the liver and is primarily excreted into the urine as propofol glucuronide. The window of detection of propofol glucuronide in urine is approximately five days to seven days following repeated dosing. USDTL now offers a urine propofol glucuronide test that can be used as a stand-alone assay or as an addition to any of our 16 UrineStat℠ drug panels. Contact Client Services at customer.service@usdtl.com or at (800) 235-2367 for further information.

Nails samples show wider history of drug use than urine

by Robert Demaree
Clinical Projects Manager

Fingernails can show up to six months of drug history. Toenails can show up to a year.

Nail samples provide an excellent alternative sample matrix to urine. Some drugs that do not bind well in hair, like marijuana, are very stable in a nail matrix. Toenails are available for post-mortem drug testing when other body fluids are no longer present. Other benefits include a gender-neutral sample collection process and a reduced risk of adulteration. In 2006, USDTL introduced broad 5-, 7-, 9-, 12- and 14-drug panels for nail samples.

Nail samples are a similar matrix to hair, a keratinized protein, and therefore can be tested similarly. Drugs are incorporated into hair and nail samples at comparable levels. Drugs enter nails through nail matrix cells located at the base of each finger or toenail. Drugs are then distributed down the nail bed. Most people do not know that nails grow both in length and in thickness, with the free end of the nail being thicker than the lunula at the base of the nail. The nail grows in thickness by adding ventral layers.

Drugs present on the nail bed are incorporated into these layers. Drugs of abuse are measurable in nail samples approximately two weeks following ingestion. Fingernail samples can reflect drug usage over a six-month period. Toenails, growing at a slower rate, can identify drug usage in the previous 12-month period. Collecting either sample will give a much longer view of drug history than urine, oral fluid or blood.

Nail testing also boasts a less demanding collection process than urine or blood. Our NailStat℠ assay requires 100 milligrams of nail sample. The amount is equal to a 2 millimeter sample harvested from each finger. When a sufficient sample volume has been collected, the sample is transferred onto the collection foil and folded for security. The completed chain-of-custody form and the sample are sealed into the specimen collection bag.

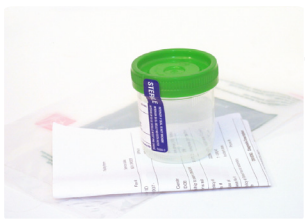
The laboratory test procedure includes an immunoassay initial test combined with LC/MS/MS or GC/MS confirmation of presumptive positive results. Screen negative results are typically reported within 24 hours of receipt into the laboratory, while confirmation of presumptive positives requires an additional 48 hours for confirmation.

USDTL's New Applications Department continues to develop nail tests in correlation with each new drug added to the growing hair test panel. In late 2009, researchers added ketamine to hair and nail panels after reports indicated an increase in ketamine abuse and fatal poisonings. Currently the New Applications Department is developing a new assay that will identify the ethyl glucuronide (EtG) alcohol biomarker in hair and nails.

For more information, contact Client Services at (800) 235-2367.

Increasingly-abused sedative Soma® now tested in urine

by Joseph Jones
Vice President Laboratory Operations



UrineStat℠ now offers 16-drug panel with carisoprodol.

According to data from the Drug Abuse Warning Network (DAWN), emergency department visits due to carisoprodol (Soma®) have increased steadily from 2004 through 2008. Carisoprodol is a centrally-acting skeletal muscle relaxant indicated for the relief of musculoskeletal pain. Carisoprodol and its major metabolite meprobamate have central nervous system (CNS) sedating effects similar to benzodiazepines or alcohol.

Carisoprodol is usually not included in standard urine assays because of the lack of a commercially available homogeneous immunoassay. Historically, laboratories have relied on cumbersome ELISA screening technology or direct analysis by LC/MS/MS, which can be very costly. Our immunoassay vendor, Immunalysis, has now released a new homogeneous immunoassay for carisoprodol and meprobamate in a simple robust format, allowing carisoprodol to be part of any standard profile.

A urine sample provides history on the last two to three days of drug use for most drugs. All presumptive specimens identified by our immunoassay screening are confirmed by LC/MS/MS or GC/MS.

We offer UrineStat℠ in 5-, 7-, 9-, 12-, 14-, 15- and 16-drug panels. We can also add our ethanol assay to any UrineStat℠ drug panel and will customize any panel for specific testing needs. USDTL recently introduced test methods in urine for propofol glucuronide, the metabolite for the increasingly-abused sedative propofol (Diprivan®).

References

-Office of Applied Studies, SAMHSA, 2009. Drug Abuse Warning Network, 2008: Selected Tables of National Estimates of Drug-Related Emergency Department Visits. Rockville, MD:
-United States Department of Heath and Human Services. SAMHSA. Office of Applied Studies. Patterns in Nonmedical Use of Specific Prescription Drugs

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