K41 Carisoprodol and Meprobamate Incidence in DUID Cases in the City and County of San Francisco

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After attending this presentation, attendees will understand the reasons carisoprodol and meprobamate can impair one's ability to safely operate a vehicle, the incidence of these two drugs in DUID cases during a three-year period (January 1, 2009 to December 31, 2011), the blood concentrations measured in these drivers, and the identity of other drugs found in the blood of these drivers.

This presentation will impact the forensic science community by adding to the existing body of literature information regarding driving behavior, drivers' symptomology, blood concentrations, and other drugs found present in the blood of drivers driving under the influence of carisoprodol and meprobamate.

Carisoprodol and meprobamate are medications that are available only by prescription in the U.S. Carisoprodol is a muscle relaxant and meprobamate is a central nervous system depressant and a major metabolite of carisoprodol. Most patients are prescribed these medications for muscular pain management or anxiety, but abuse may develop due to the sedative-hypnotic effects these compounds produce.

In San Francisco, blood evidence is screened for ethanol and related compounds by Headspace/Gas Chromatography equipped with Flame Ionization Detection (HS/GC/FID). Blood is further screened by enzyme-linked immunosorbent assay for barbiturates, cannabinoids, cocaine, methadone, methamphetamine, opiates, and phencyclidine and by Gas Chromatography/Mass Spectrometry (GC/MS) in full scan mode for over 100 drugs and metabolites. Following a positive screening result for carisoprodol and/or meprobamate by GC/MS, a fresh aliquot of blood is extracted by liquid-liquid extraction and reanalyzed by GC/MS using quantitative calibrators freshly prepared in drug-free swine blood.

For the purposes of the present study, the in-house computerized database was interrogated, and 21 driving cases in which the laboratory had reported carisoprodol and/or meprobamate in blood specimens were identified during the three-year period of interest. Police reports were reviewed and information regarding the date/time of driving, the observed driving, and field sobriety test performance was collected. The 21 drivers with reportable carisoprodol/meprobamate in their blood comprised of 6 females and 15 males. The mean age of all drivers was 32 (range: 19 – 50). The mean age in females was 38 (range: 25 – 50) and 28 (range: 19 – 44) in males. Police reports indicated that drivers freely admitted to taking carisoprodol/meprobamate, did not exhibit breath odor of alcoholic beverage, displayed glossy, watery eyes, and slurred speech. Their demeanors were described as calm and relaxed. During the horizontal gaze nystagmus, clues observed included inability to follow the object, inability to keep head still and track only with eyes, lack of convergence, and lack of reaction to light. During the Romberg test, clues observed included eyelid fluttering, opening of the eyes during the test, and estimation of 38 – 95 sec for 30 sec. The clues observed during the "one leg stand test" included poor balance, inability to keep the foot off the ground, and raising arms up to six inches to maintain balance. Clues observed during the "finger count test" included touching the finger pads instead of the tips and miscounting the steps and the number of steps performed.

Carisoprodol was reported in all 21 driving cases while meprobamate was reported in 20 of the 21 cases. The mean carisoprodol and meprobamate concentrations and associated ranges in all 21 drivers were 11mg/L (0.8 – 26mg/L) and 20.4mg/L (3.2 – 38mg/L), respectively. Carisoprodol and/or meprobamate were the only drugs detected in one-third of the cases included in this study (7 of 21 cases). In these seven cases, the mean carisoprodol and meprobamate concentrations were 12.3mg/L (7.3 – 16mg/L) and 30.4mg/L (19 – 36mg/L), respectively. In the remaining 14 cases where carisoprodol/meprobamate were not the sole compounds detected, drivers' blood specimens were found to contain on average two more psychoactive compounds including benzodiazepines (n=3), cannabinoids (n=3), oxycodone (n=3), ethanol (n=2), methadone (n=2), hydrocodone (n=2), cocaine/benzoylecgonine (n=2), methamphetamine (n=1), MDMA (n=1), citalopram (n=1), and tramadol (n=1).

Carisoprodol/meprobamate occurrence in driving under the influence cases in the City and County of San Francisco is a significant and on-going challenge. Often these drugs are present with other psychoactive compounds in drivers, making it difficult to assign specific signs and symptoms to them. Carisoprodol/meprobamate were the only drugs found in the blood of drivers in the minority of these 21 cases whereas in most of the cases, they were present together with several other compounds, primarily benzodiazepines, cannabinoids, and oxycodone.

Carisoprodol, Meprobamate, DUID

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