



K30 Fatal Caffeine Intoxication: A Review of Seven Cases From 1999-2009

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After attending this presentation, attendees will understand the symptoms and postmortem toxicological assessment of caffeine intoxication. The purpose of this study was to retrospectively study all caffeine intoxication deaths over a ten year period.

This presentation will impact the forensic community by analyzing the largest series of caffeine intoxication deaths to date and highlighting the importance of testing for caffeine in postmortem samples.

Caffeine, 1,3,7-trimethylxanthine, is the most widely consumed legal stimulant given its natural occurrence in foods including coffee, tea, chocolate, yerba mate and guarana. The average content per serving is 30-60 mg per 12 ounces of a soft drink, 50 mg in 8 ounces of iced or hot black tea, 50-70 mg in 8 ounces of iced coffee and 80-120 mg in 8 ounces of hot coffee. It is estimated that average daily adult caffeine consumption is 300 mg and that moderate consumption for most adults is thought to be safe. Caffeine has been widely used in pharmaceuticals including treatment of neonatal sleep apnea, acute respiratory depression, anorectant, and most commonly for headaches and migraines. The most potent forms are available as over the counter oral caffeine tablets, each containing 100-200 mg per tablet, taken for fatigue and alertness. Rarely, serious toxicities are seen with caffeine excess, at plasma levels of 15 mg/L or higher. Toxic symptoms include weakness, vomiting, fever, seizures, cerebral edema, cardiac arrhythmias (supraventricular tachycardia or ventricular fibrillation), hypokalemia, hypocalcemia, hyperglycemia, coma, and even death. Caffeine concentrations of 80 mg/ L are considered lethal. We report seven fatal cases of caffeine intoxication listed over the past 10 years.

A retrospective database search of cases with "caffeine" in the cause of death was performed 1999 to present. All available medical records and scene investigation data were reviewed. At autopsy, heart blood and peripheral blood were collected for routine toxicological screen of 12 classes of alkaline drugs. Caffeine was detected during routine comprehensive drug testing by gas chromatography-nitrogen phosphorus detection following an alkaline extraction of the biological specimens. The presence of caffeine was confirmed by full scan electron ionization gas chromatography-mass spectrometry. Caffeine was quantified using gas chromatography-mass selective detector using spiked caffeine calibrators.

A total of seven cases were identified over the ten-year period. The subject demographics were 4 women and 3 men. There were five Caucasians, one Hispanic and one African American subjects. The average age was 49 years (range 37-57). The manner of death for two cases was classified as suicide while the remaining five cases were undetermined. The average postmortem caffeine level was 117 mg/L (range 33-320 mg/L). Isolated caffeine intoxication occurred in five cases, combined caffeine and butalbital intoxication was seen in one case and one case had combined caffeine and alcohol intoxication. Sources of caffeine included over the counter caffeine tablets and prescription medication.

This study is the largest case series reported to date of lethal caffeine intoxication. Although caffeine is generally regarded as safe for routine use, this study clearly demonstrates that lethal intoxications can occur. Both clinical and postmortem awareness must be maintained and comprehensive toxicological testing should screen for methylxanthines to detect caffeine.

Caffeine Intoxication, Methylxanthine, Toxicology