



Pathology Biology Section – 2009

G62 Investigation of Acute Oxymorphone (Opana® ER) and Ethyl Alcohol Intoxication

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After attending this presentation, the attendees would appreciate the significant impact of coordinated interdisciplinary approach in determining an acute oxymorphone (Opana) and ethyl alcohol intoxication.

The presentation will impact the forensic science community by reporting the limitations of ELISA methodology for screening detection of oxymorphone (Opana®)

Scene investigation, circumstantial information together with thorough autopsy/toxicology and ancillary studies constitute the triad of a competent medicolegal death investigation. Herein is described the death investigation of a 28-year-old Caucasian male, whose cause of death would be classified undetermined, had the systematic aforementioned principles not been applied. The case is characterized by astute police investigative efforts, competent scene recovery and awareness of synergistic drug effects between Opana®ER (oxymorphone) and ethanol. The decedent, accompanied by friends, participated in a celebration at a local bar prior to a major social event. Following a period of marked ethanol consumption, the decedent returned to a friend's house and retired. Approximately 6.5 hours later, attempts to awake the decedent were unsuccessful; he was found to be apneic and in asystole. Resuscitative efforts were initiated and ACLS protocols followed as the decedent was transported to a nearby emergency room. The decedent was pronounced shortly after arrival.

Autopsy findings revealed a well nourished, well developed 28-year-old Caucasian male, measuring 71 inches long and weighing 160 pounds. No external or internal evidence of trauma was detected. All body organs revealed weights within normal limits, with the exception of heavy lungs indicating severe pulmonary edema. Initial postmortem toxicology indicated non-fatal concentrations of ethanol at 0.11%, 0.14%, and 0.25% respectively in blood, vitreous humor, and urine. The scene investigation did not indicate an unsafe sleeping environment. Gross and microscopic examinations were negative for gastric contents or foreign body aspiration.

The cause of death remained undetermined until a second review and reassessment of the police investigation, including witness testimonies, raised suspicion for a drug-related event. In the area where the decedent had been sleeping, a broken 40 mg tablet of Opana®ER was found in a prescription vial on a shelf. The decedent's friend stated to police he never crushed or broke the prescription tablets. Further, the friend stated that on past occasion the decedent requested his medication for experimental use. The friend denied compliance with previous requests and no inquiry was made by the decedent the night of the party.

Additional toxicological studies included directed analysis for synthetic opioids by GCMS/SIM in blood and urine. The analysis revealed oxymorphone concentrations of 95 ng/mL and 214 ng/mL in blood and urine, respectively. The UMass Forensic Toxicology Laboratory employs ELISA technology, which includes a specific assay for oxycodone, in front line presumptive screening of postmortem blood.

Oxymorphone, a metabolite of oxycodone, exhibits limited cross reactivity in this assay (at a 50 ng/mL positive cut-off concentration for oxycodone approximately two and one-half times that concentration, or 130 ng/mL oxymorphone, is needed to elicit a positive response). The ELISA result for oxycodone was therefore negative.

The cause of death was certified as acute oxymorphone and ethyl alcohol intoxication. Most notably, the drug's manufacturer cautions contemporaneous use of alcohol since oxymorphone plasma concentrations may increase as much as 270% and causes fatal overdose. Similar to OxyContin®, crushing or breaking Opana®ER tablets defeats the extended release formulation and precipitates delivery of the drug's full dose into the blood.

This case underscores the significance of a coordinated, interdisciplinary approach to competent death investigations. Absent or superficial scene investigations, cursory or incomplete autopsy examinations, and inadequate toxicological studies can undermine accurate cause of death certifications.

Toxicology, Synthetic Opioids (Opana), ELISA