G18 Case Report of a Fatal Intoxication by Nucynta®

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After attending this presentation, attendees will learn about a case, in which, Nucynta®, a newly released analgesic, a Schedule II controlled substance, comparable to tramadol, was fatally ingested.

This presentation will impact the forensic science community by raising the awareness of the toxicity of novel drugs, which is essential for medical examiners and forensic toxicologists.

Tapentadol (Nucynta®) is a centrally acting opioid analgesic prescribed for the treatment of moderate to severe acute pain. Its efficacy is believed to be due to mu-opioid receptor agonist activity and inhibition of norepinephrine reuptake resulting in increased norepinephrine concentrations. Metabolism of tapentadol is via glucoronidation to inactive metabolites. There are no cases in the literature relating to the toxicity of this agent or reports of fatalities. This report documents a case in which tapentadol was identified as the cause of death. The decedent was a 40-year-old obese male who was found at home by his girfriend. He had been prescribed Nucynta® (tapentadol) for shoulder pain, Lexapro (citalopram), and amitriptyline. There appeared to be more tablets missing than expected. At autopsy, there were early decomposition changes and hepatomegaly with fatty change.

Routine volatile, therapeutic drug, and abused drug testing was performed on the heart blood in this case. This included: (1) methanol, ethanol, acetone, and isopropanol analysis by head space gas chromatography (GC); (2) acid/neutral drug screen by GC-nitrogen- phosphorus detection (NPD); (3) alkaline drug screen by GC-NPD; (4) acetaminophen and salicylate by color test; and, (5) morphine and benzodiazepines by enzyme-linked immunosorbent assay (ELISA). The blood ethanol concentration was 0.01 g/dL; the vitreous humor ethanol concentration was negative. The alkaline drug screen was positive for diphenhydramine (0.6 mg/L), amitriptyline (1.1 mg/L), nortriptyline (<0.1 mg/L), and citalopram (0.3 mg/L). All were confirmed by full scan electron ionization gas chromatography/mass spectrometry and quantified by GC-NPD.

Given the case history, the heart blood was sent to a reference laboratory for tapentadol analysis. Tapentadol was quantified by liquid chromatography – mass spectrometry/mass spectrometry (LC-MS/MS) using D5-tapentadol as internal standard. Extraction of tapentadol from blood involved addition of carbonate buffer followed by methyl-tert- butylether (MBTE). After taking the MTBE layer to dryness, methanol was added and then transferred to an autosampler vial for injection. The limit of detection (LOD) and limit of quantitation (LOQ) of the assay were 0.06 ng/mL and 0.5 ng/mL, respectively.

The therapeutic range for tapentadol is 5-300 ng/mL. The tapentadol concentration found in the heart blood submitted in this case was 6600 ng/mL; more than 20 times the upper limit of the therapeutic range. Possible mechanisms of death include respiratory depression, CNS depression, and serotonin syndrome.

Based on the scene investigation and autopsy findings in this case, the medical examiner determined that the cause of death was narcotic (Nucynta®) intoxication and the manner-of-death was undetermined.

Tapentadol, Nucynta®, Overdose

 ** Presenting Author*