H176 An Excipient-Induced Oxycodone Fatality

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Learning Overview: After attending this presentation, attendees will be able to differentiate death due to injecting extended-release tablet formulations instead of relying specifically on low concentrations of oxycodone in postmortem blood.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by raising awareness of oxycodone in fatal toxicity and challenging assumptions of lethal ranges when considering the adverse vascular effects of parenteral administration of an extended-release tablet.

Opiates such as oxycodone are among a class of semi-synthetic analgesic narcotics indicated for relief of postsurgical pain. Opiate toxicity manifests through its sympatholytic properties of decreased cardiac output and respiratory depression, along with observable side effects such as urinary retention and miosis. Extended-release preparations of oxycodone are often formulated with polyethylene oxide to reduce dosing frequency and curb abuse by preventing rapid absorption. When used outside the parameters of intended delivery, such as intravenous injection, the user is abusing the drug to achieve a larger dose in a shorter time.

However, intravenous delivery creates a condition in which the extended-release excipients can cause fatality without the accompanying signs of opiate intoxication and result in relatively low postmortem concentrations of oxycodone. Patients reporting to emergency care will paradoxically suffer from shortness of breath, fever, and diarrhea. In these cases, Thrombotic Thrombocytopenic Purpura (TTP) -like illnesses later determined to be thrombotic microangiopathy have been diagnosed in patients who crush and inject tamper-resistant opiates (e.g., oxycodone and tapentadol). This is likely due to vascular inflammatory reactions and hemolysis from particulates in the suspension. Although thrombotic microangiopathy and TTP-like illnesses have been reported in the literature from intravenous injection of tamper-resistant opiates, none to date have been described in the forensic literature with appropriate quantitative toxicologic analysis.

Presented here is a case in which the decedent created and injected a formulation consisting of crushed oxycodone and tapentadol tablets mixed into a solution containing promethazine and meperidine. The decedent was found approximately eight hours after sending a voice-to-text message, with slurred slow speech, stating his last wishes. A tourniquet was in place around the upper arm with two injection marks in the antecubital fossa. The decedent was clutching a 50-milliliter syringe with a large bored needle that contained a clear, brown-tinged, viscous fluid. Autopsy findings were consistent with a typical opiate-associated fatality (pulmonary edema, urinary retention). Review of the prescription drug database showed the decedent had chronic opiate dependence, currently taking oxycodone, with a remote prescription for tapentadol. No prescription bottles were found on scene.

The toxicology showed a number of substances, including ethanol, diazepam, oxycodone, meperidine, methocarbamol, tapentadol, and promethazine. However, all were within moderate concentrations and inconsistent with fatal toxicity. Microscopic examination showed endothelial swelling of the arteries in the kidney and fragmented red blood cells (schistocytes) consistent with thrombotic microangiopathy.

This presentation shows how, under these circumstances, the mechanism of death should be carefully elucidated in deaths resulting from intravenous drug abuse of tamper-resistant substances with less reliance and emphasis on reference ranges of the measured drug concentrations. In conclusion, this study describes a death resulting from injecting crushed tamper-resistant, extended-release oxycodone and tapentadol tablets.

Oxycodone, Extended-Release, Intravenous