G130 Death Following Ingestion of Compounded Topical Cream

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The goal of this presentation is to describe a death and the associated autopsy findings following suspected ingestion of a compounded topical cream prescribed for the treatment of neuropathic pain.

This presentation will impact the forensic science community by describing how a seemingly safe topical pain medication could be lethally abused.

Topical application for the management of pain has become increasingly utilized because it has a major advantage of minimizing side effects due to lower systemic drug absorption. Additional advantages include direct delivery and increased drug concentrations to the pain source, reduction of possible drug interactions, ease of delivery, and better compliance for patients with difficulty swallowing pills. Topical creams come in various formulations and may be "compounded" or customized based on clinical symptoms. These may include combinations of opioids, tricyclic antidepressants, anticonvulsants, local anesthetics, and alpha-2 adrenoceptor agonists. When used appropriately and as prescribed, topical creams typically do not cause death. However, there is limited documented evidence on the lethality of these topical creams when ingested or delivered through a source other than the skin.

The following novel case study involves a 30-year-old male with a history of jaw pain secondary to an unresolved jaw fracture from remote trauma. His medical history included depression and anxiety. His social history was significant for polysubstance dependency and multiple opioid overdoses. He had been treated for his substance abuse in both inpatient and outpatient settings. His previous medications included methadone, oxycodone, gabapentin, fentanyl, various muscle relaxants, and anti-depressants. At the time of his death, he was being treated by a psychiatrist, an internist, and a pain specialist. Following a recent meeting with his pain specialist, he was prescribed a topical cream containing ketamine (10%), cyclobenzaprine (4%), gabapentin (6%), tramadol (8%), clonidine (0.2%), and amitriptyline (4%). The cream was formulated by a compounding pharmacy and was dispensed in an airless metered dosing pump (40 grams total weight). It was sent to the decedent's residence and the decedent signed for the package himself. Two days later, the decedent was found unresponsive in his bed following multiple failed attempts to reach him. Scene investigation was significant for a postmortem rectal body temperature of 106°F. The metered dosing pump containing the cream was found at the scene and, based on the calculated weight of the container and the substance, deemed to be empty.

At autopsy, the decedent was of appropriate build and nourishment and external examination was unremarkable. Internal examination revealed approximately 300mL of gastric contents in the left pleural cavity. Further examination revealed defects of the stomach and diaphragm suggestive of gastromalacia. There was no gross color change of surrounding organs evident. The remainder of the examination was unremarkable. Histologic examination showed no inflammation or any vital reaction of the pleura. Toxicological examination revealed femoral blood concentrations (mg/L) as follows: amitriptyline 0.28; nortriptyline 0.47; tramadol 0.89; cyclobenzaprine 0.42; ketamine 0.15; and gabapentin 5.40. Oxycodone and oxymorphone were detected in the urine, but not the blood. Gastric contents were retained and re-examined at a later time. After thawing, a viscous, dark yellow and granular substance was present at the top of the tube. Toxicological examination on a portion of total gastric contents revealed concentrations (mg/L) as follows: amitriptyline 225; tramadol 214; cyclobenzaprine 217; ketamine 239; and gabapentin 132.

Although considered safe and unlikely to cause significant systemic concentrations of drug, medical examiner's must always consider the possibility that these topical creams are potentially ingested or delivered through another mucosal source and can lead to significant systemic absorption. This must be considered especially in circumstances where the recipient has a known history of substance abuse. Careful examination of gastric contents and other mucosal surfaces must be correlated with scene examination and clinical history.

Topical Pain Creams, Compounded Creams, Gastromalacia

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