K72 Suicide by Pesticide? A Case Study of Fenobucarb Ingestion

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Learning Overview: After attending this presentation, attendees will better understand: (1) the pathological and toxicological findings that indicate death due to the ingestion of 2-(1-methylpropyl) phenyl methylcarbamate (fenobucarb), (2) the symptoms of carbamate poisoning, and (3) how the autopsy results of carbamate pesticide ingestion differ from bleach/hydrofluoric acid ingestion.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by demonstrating the need for open lines of communication between pathologists and toxicologists to determine the cause of death in cases in which misleading information may be provided to investigators by family, hospital personnel, and first responders. This presentation will also impact the forensic science community by demonstrating the need for toxicologists to utilize antemortem clinical manifestations and autopsy findings to guide their route of analysis.

In December 2015, a 44-year-old Black male and his wife were involved in a heated, verbal and physical altercation at their residence. During the dispute, the intoxicated decedent discharged a handgun, causing his family to vacate the scene. He then went inside the residence and attempted suicide by ingesting an unknown caustic liquid. According to first responders, the liquid was hydrochloric acid, hydrofluoric acid, or bleach. Numerous attempts were made by the investigator to retrieve the unknown liquid from the terminal event scene. However, because the decedent was taken to the hospital, the bottle was never impounded by police or crime scene investigators.

The decedent was treated by fire rescue and taken to the hospital, where he expired three hours later. The decedent was conscious while being treated, but exhibited altered mental status, vomiting, and increased secretions. Upon arrival at the emergency room, the decedent presented with hypersalivation, respiratory failure, hypocalcemia, and increased potassium levels. The hospital staff consulted the Poison Control Center along with a hospital toxicologist. The toxicologist recommended aggressive calcium administration, a gastrointestinal endoscopy in less than 12 hours, and a calcium gel placement. Despite medical intervention, he went into cardiac arrest and expired in the emergency room.

Significant autopsy findings included the ingestion of 1.325L of a green-black, sludgy, granular fluid in the stomach, associated with staining of adjacent tissues, hemorrhage of retroperitoneal and mesenteric adipose tissues, hemorrhage of the soft tissues of the porta hepatis, left pleural effusion (140mL), and ascites (50mL). These findings were not characteristic of the ingestion of bleach or acid, which would have caused significant destruction of the stomach wall and soft tissues of the abdomen. Routine toxicological analysis detected ethanol (0.130%) in the antemortem blood, as well as diphenhydramine, lidocaine, ibuprofen, and naproxen in the gastric contents.

With no definitive cause of death, further toxicology testing was deemed necessary in this case. The pH of the gastric contents was tested to definitively rule out acid or bleach consumption, and the results indicated a physiologically normal pH of 2–3. Because of the autopsy findings and the decedent's symptoms prior to death, a screen to rule out organophosphate poisoning was performed. The gastric and small intestine contents were screened by Liquid-Liquid Extraction followed by Gas Chromatography/Mass Spectrometry (LLE-GC/MS) and 2-(1-methylpropyl) phenyl methylcarbamate (fenobucarb) was detected. Fenobucarb is a carbamate insecticide, and symptoms of carbamate poisoning include, but are not limited to, increased secretions, diarrhea, vomiting, confusion, respiratory depression, and cardiac arrest.

Based on the decedent's history, autopsy findings, and toxicology results, the forensic pathologist determined that the cause of death was ingestion of 2-(1-methylpropyl) phenyl methylcarbamate (fenobucarb), and the manner of death was suicide. This case demonstrates the necessity to consider all information, including clinical manifestations prior to death, autopsy findings, and toxicology results, in order to make an accurate determination as to cause and manner of death. This case also exemplifies that information provided to investigators from outside sources may not be accurate and may cause the investigation to head in the wrong direction.

Fenobucarb, Carbamate Pesticide Poisoning, Postmortem Toxicology