K36 Pediatric Postmortem Toxicology: Involvement of Diphenhydramine in a Child Death

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After attending this presentation, the attendee will: 1) appreciate the importance of drug testing in all child deaths, (2) understand the factors which must be considered when evaluating the role of drugs in deaths of the young, and (3) possess information regarding drug concentrations in postmortem specimens from a pediatric case.

Diphenhydramine (DPH) is an antihistamine present in many medications available for the relief of allergic responses. It is also a component in combination medicines for congestion, colds and sinus headaches or as a component of itch stopping cream/gel or spray. It is available as a liquid, in chewables, tablets, caplets, capsules, and gelcaps. Recommended doses for formulations available for adults are typically 25-50 mg DPH HCl. These medications are contraindicated for children less than 12 years of age. Peak plasma concentrations in clinical adult specimens are typically <0.15 mg/L after oral administration.

Allergy medications for young children may be in liquid form and one teaspoon usually contains 12.5 mg diphenhydramine hydrochloride (HCl). The recommended dose for one formulation for a child 12-23 months with a weight of 18-23 lbs is 3/4 teaspoon or 9.3 mg DPH HCl every 4 hours. The indications for use of this drug are symptoms associated with hay fever and other respiratory allergies including sore/itchy throat, itchy/watery eyes, runny/stuffy nose, and sneezing. This case report describes the death of a young child while at the home of her childcare provider involving the administration of diphenhydramine.

A 17-month-old white female, weighing 26 lbs, was found dead in a playpen crib in an upstairs bedroom of the care provider's house. The crib contained numerous blankets and nylon carrying bags. According to the care provider the child was found unresponsive with a bed sheet tangled around her neck. CPR was initiated without success. The body was transported to the Office of the Cuyahoga County Coroner for autopsy. Autopsy findings included red petechiae over the left mastoid region and a linear transverse aggregate of red petechiae over the right anterolateral neck. Heart and femoral blood, cerebrospinal fluid, gastric contents, bile and vitreous humor were collected for toxicological analysis.

The heart blood was subjected to comprehensive toxicological testing which included volatiles by headspace gas chromatography; acetaminophen, salicylate and ethchlorvynol screening by colorimetry; acidic/neutral and basic drug screening by liquid-liquid extraction followed by GC-FID or GC-NPD with confirmation by GC/MS; benzodiazepine screening by GC-ECD; and modified opiate immunoassay screening. The only drug identified and quantitated was diphenhydramine. Due to the unusual circumstance of positive drug results in a young child and to understand issues of postmortem redistribution, the femoral blood, and gastric contents were also tested for diphenhydramine. DPH was detected at the following concentrations (mg/L): 0.49 heart blood, 0.27 femoral blood, and 0.36 mg in 20 mL gastric contents.

A search of the literature revealed little information on DPH pharmacokinetics in children and few cases of DPH detection in pediatric fatalities. Although the common side effect of DPH is drowsiness, it may also cause seizures in children. In light of the available literature and case circumstances, death due to a DPH overdose was discounted. Therefore, possible mechanisms to explain the child's death included entanglement in the bed sheet with inability to escape caused by the sedating effect of the drug or drug induced seizure with the ensuing entanglement. The cause of death was determined to be asphyxia due to entanglement by bed sheet around the neck, with other condition, recent ingestion of DPH. The death was ruled a homicide.

Pediatrics, Forensic Toxicology, Diphenhydramine

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