K46 Postmortem Pediatric Toxicology

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After attending this presentation, attendees will gain an appreciation for the challenges unique to toxicological findings in postmortem pediatric cases. Attendees will learn interpretive guidelines for pediatric cases involving forensic toxicology in both a general and case-specific sense.

This presentation will impact the forensic science community by further delineating the interpretive aspects of toxicological findings in the pediatric population.

In this 13th Annual Special Session within the Toxicology Section, pediatric cases involving toxicological findings are discussed. As a relative dearth exists of interpretive information involving toxicological findings in the pediatric population, this session is a forum to help elucidate and clarify such issues. The format is a short case presentation including pharmaco-toxicokinetic data and other relevant ancillary information followed by audience participation to provide interpretive clarity around the case-specific impact of the toxicological findings. This presentations allows for various perspectives of case issues that lead to integrative consensus, or differing opinions, as to cause of death in children.

Dr. Jack Kalin will review data related to toxicological findings in stillbirths. This specific population is somewhat unique given its direct dependence on the mother, her exposures and the pharmacokinetic and toxicokinetic changes that occur during pregnancy. These changes include altered maternal hepatic biotransformation, increased gastric emptying, decreased gastric motility and altered renal blood flow. As an additional factor, placental transfer, biotransformation, etc. affect the fetal insult due to maternal exposure to potentially harmful agents. Coupled with maternal changes are the developing characteristics of the fetus, its metabolic capabilities, and the toxicodynamics effects of specific agents.

Dr. Marina Stajic will present a case involving lithium. Lithium, a classic antipsychotic agent, is a potentially teratogenic substance and is one of the few agents that can result in hypercalcemia in children. Pharmacokinetics of lithium in children varies from that in adults with a shorter half-life and faster renal clearance. Classically, lithium has a narrow therapeutic index leading to potential severe toxicity at low doses. There is debate as to the clinical utility of lithium in younger children.

Dr. David Benjamin will address an extremely difficult interpretation of clonidine and other toxicological findings in a suspected filicide. Clonidine, a centrally-acting alpha-2 receptor agonist used to control blood pressure in adults, is used in children to help control attention deficit hyperactivity disorder (ADHD) and other behavioral deficits. The use of this drug in children can induce sedation and a hypertensive crisis upon abrupt withdrawal.

Dr. Michael Heninger will discuss findings involving methadone and fentanyl and the problems associated such agents in children. Most childhood exposures to these compounds are either accidental or intentional for purposes of sedation, but not homicidal. Both compounds are classified pharmacologically as opioids and have the associated sequelae of these agents, including CNS-depression capable of producing death. Methadone has recently been tagged as a compound capable of producing death even with therapeutic use based on adverse cardiovascular events. Fentanyl on the other hand, has strict black box warnings due to potency (80-100 times that of morphine).

The case studies presented reflect current day findings in medicolegal investigations of childhood deaths. In years past, discussions of these type cases have been educational and demonstrative of the issues in this special population. Only through these continued case studies and audience participation can there be shared perspectives on the meaning of the toxicological findings.

Pediatric, Toxicology, Postmortem

 ** Presenting Author*