

H8 Infant Deaths Associated With Methamphetamine Exposure: A Case Series

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Learning Overview: The goal of this presentation is to compare the characteristics of infant deaths in which methamphetamine was a cause or contributing factor.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by exploring ways an infant may be exposed to methamphetamine and the potentially complex medicolegal questions raised in these cases.

Background: Although the consequences of prenatal methamphetamine exposure have been explored, comparatively less is known about the effects of methamphetamine exposure in infancy.¹ Moreover, the toxic concentration of methamphetamine in infant blood is unknown. For infants in which methamphetamine is detected in postmortem blood, several key questions can be posed: what was the source of the methamphetamine, what was the route of exposure, and what do the postmortem blood concentrations mean? It has been reported that young children may be exposed to methamphetamine in several ways, including through food/beverage contamination, transdermal absorption, accidental ingestion, second-hand smoke, and mother's breastmilk.²⁻⁵ Though there are several studies regarding methamphetamine and its role in fetal and infant deaths, limits of toxicity and lethality are unclear.⁶⁻⁸ These complex questions are of utmost importance in the medicolegal arena. After a recent series of infant deaths in which methamphetamine was a potential contributing factor, this study aimed to identify similar prior cases.

Materials/Methods: This study searched a database of deaths investigated by medical examiner offices serving multiple counties in western Michigan for infant deaths in which methamphetamine may have contributed. A search was conducted for "amphetamine" in Part I (a, b, c, and d) and in Part II ("Other significant conditions") of the death certificate.

Case Histories: Three cases were identified in the database, all of which listed "Methamphetamine exposure" in Part II. There were no cases in which methamphetamine toxicity was an immediate or direct cause of death.

The first infant was an 8-month-old female found unresponsive in her crib with a bottle, stuffed animal, and cup. The infant was formula fed. Drug paraphernalia was found in the decedent's room at the time of the scene investigation. The father of the decedent admitted to recent use of methamphetamine. A doll reenactment showed no evidence of airway obstruction. Autopsy findings included idiopathic pulmonary hemosiderosis. Heart blood was positive for methamphetamine (11ng/mL).

The second infant was a 6-day-old female found unresponsive while bedsharing with an adult. The infant was both breastfed and formula fed. Parents admitted to methamphetamine use on the day of the infant's death. A doll reenactment was performed, and the possibility of airway obstruction could not be excluded. Heart blood was positive for methamphetamine (19ng/mL).

The third infant was a 2-month-old male found unresponsive lying supine between two adults. Reportedly, the infant was also covered by a pillow. The infant was formula fed. Marijuana plants were found in the home, but no other illicit substances or paraphernalia was found. A doll reenactment was not performed. Heart blood was positive for methamphetamine (10ng/mL).

Results/Discussion: In all three infant deaths, heart blood methamphetamine concentrations were at or near the reporting limit. Isomer differentiation revealed that, in all cases, 100% of the methamphetamine detected was dextro(D)-methamphetamine, consistent with the Drug Enforcement Administration (DEA) Schedule II central nervous system stimulant. In one case, the infant may have been exposed to methamphetamine via breastmilk. Notably, in two cases, an unsafe sleep environment was listed as a contributing factor, while a component of unsafe sleep could not be entirely excluded in the remaining case. Additionally, one infant had pulmonary hemosiderosis. Therefore, in all three cases, there were competing causes of death and/or contributory factors. The manner of death was indeterminate in all cases.

The question of route of exposure remains unanswered in all cases. One must be aware of pediatric developmental milestones to rule out possible scenarios and to corroborate potential reports (e.g., accidental ingestion). Such information may impact not only manner of death determination but also possible criminal charges. Additionally, it is still unknown "how much methamphetamine is too much?" The blood concentrations in these cases are among the lowest reported in deaths associated with methamphetamine; however, where the line of toxicity should be drawn remains up for debate.

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