



Pathology Biology Section – 2011

G4 Periventricular Leukomalacia in a 2- Month-Old Infant Who Was Born With Cocaine Addiction: A Case Report

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After attending this presentation, attendees will be aware of the neuropathologic sequela in a 2-month-old infant born with addiction to cocaine. The prenatal history and the scenario surrounding the infant's death will be presented. Common outcomes of the effects of cocaine on the fetus and newborn are reviewed.

This presentation will impact the forensic science community by demonstrating that cystic periventricular leukomalacia is one of the irreversible neurological complications that directly or indirectly may occur in cocaine-exposed fetuses and the dilemma in considering the cause and manner of death of the similar cases will be discussed.

Case presentation: The decedent was a 2-month-old African American female who was born precipitously in an ambulance at 30 weeks gestational age to a 29-year-old mother who had a history of cocaine and marijuana abuse and used crack cocaine the day she gave birth. She had no prenatal care for this pregnancy. She had given birth to three live children, including the decedent, and all three were born addicted to cocaine. She also gave birth to one stillborn (female). This decedent's birth weight was 1,034 grams and length was 19 inches. She was diagnosed with cocaine addiction and respiratory failure, was on mechanical ventilation for the first two days of her life, and stayed in hospital for 20 days before being discharged home. The discharge diagnosis includes bilateral periventricular leukomalacia. The infant was adopted by her biological mother's sister. The decedent's condition was stable and she was fed with formula. At 20:04 on the day of the incidence, when lying supine on the couch in the living room with her adoptive mother, the decedent suddenly exhaled and stopped breathing. The adoptive mother started to gently rub the decedent's chest and the decedent still did not get breath. 911 was called and the decedent was transported to a hospital by ambulance with an admission diagnosis of cardiac arrest. CT scans/X-rays revealed a large right pneumothorax and pneumoperitoneum. An emergency chest tube placement and exploratory laparotomy were performed in the operating room. The decedent was taken to the intensive care unit and her condition deteriorated. Pronouncement was made at 13:40 the next day after the incident.

Autopsy findings included a poorly developed 2-month-old black female with less than 5th percentile of body weight and length. No traumatic injuries were identified. The lungs exhibited atelectasis. The brain exhibited bilateral cystic periventricular leukomalacia and severe hypoxic/ischemic encephalopathy. Accessory tests were non-contributory.

Discussion: Effects of cocaine on the developing central nerve system of a fetus may cause different pathologic changes, such as germinal matrix hemorrhage or cystic changes, introventricular hemorrhage, and periventricular leukomalacia. However, those changes are difficult to interpret as the sole consequence of the effects of cocaine because risk factors in cocaine abusing pregnant women tend to cluster together and interact, such as multiple drug use, poor maternal nutrition, lack of prenatal care, infectious disease, placental insufficiency, impaired fetal oxygenation, fetal intrauterine growth retardation, and premature birth. All the above CNS pathological changes can also be present in the premature newborn without intrauterine cocaine exposure. In addition, the premature infants with or without intrauterine cocaine-exposed tends similarly to be poorly grown, easily susceptible to infection and vulnerable for sudden infant death. **Cause of Death:** Although a definitive cause and effect relationship between these conditions and cocaine use is difficult to reach, the fact of intrauterine exposure of cocaine could not be ignored in this case. The cause of death was the complication of premature born with addiction to cocaine associated with cerebral cystic periventricular leukomalacia and severe hypoxic/ischemic encephalopathy. **Manner of Death:** Detailed history of the mother's cocaine abuse and the circumstances surrounding the decedent's addiction to cocaine at the time of birth were unclear, even though thorough investigation was performed and the death occurred two months after birth. In addition, constitutional issues may preclude criminal prosecution in many of these kinds of cases. The manner of death was classified as "Undetermined."

Cocaine, Fetus, Periventricular Leukomalacia