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Case report

Infant death associated with maternal methamphetamine use during pregnancy and delivery: A case report

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ABSTRACT

The case described in this report is of a male infant who was found dead in a closet. His mother delivered the infant in the kitchen, left him wrapped in a towel, and called emergency medical services 4 days after the delivery. At the autopsy, the growth suggests a full-term delivery, significant pathological findings were not observed, and the infant was estimated to be stillborn. After the autopsy, the police investigation discovered that the mother used a stimulant during the pregnancy and shortly before the rupture of the membrane. Toxicological analysis showed 1.60 mg/L of methamphetamine in the blood, strongly suggesting that the fetal death was associated with this acute intoxication. Thus far, only a few cases of infant deaths have been reported in association with methamphetamine intoxication. The present case showed the highest blood concentration of methamphetamine compared to the past infant cases with this intoxication.

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1. Introduction

Death associated with stimulants is a major concern in forensic medicine. Methamphetamine is a common stimulant that is illicitly abused mainly by adults. The acute intoxication by methamphetamine can occasionally cause the death of the user. However, it is not always straightforward that the death is attributed to the acute intoxication by methamphetamine. Due to the tolerance [1,2], reverse-tolerance [1,2] or redistribution [3,4], the fatal concentration of methamphetamine in the blood varies among the reports, and ranges from 0.5 to 41 mg/L [1,5,6]. Simultaneous use of other abusive drugs or the pathological conditions in the patients might also obscure the drug's independent effect when determining the cause of death.

The interpretation of the fatal concentration of methamphetamine in the blood becomes more complicated in children. A fatal case due to acute intoxication by methamphetamine is fairly rare among children. Epidemiological analyses of deaths associated with methamphetamine poisoning show few cases of children, and the specific data about the blood concentration are not described [2,7,8]. This report presents a case of an infant's death that was associated with acute intoxication by methamphetamine caused by the maternal abuse during the pregnancy and the delivery. The literature is reviewed for fatal intoxication attributable to an overdose of methamphetamine in infants.

2. Materials and methods

2.1. Case history

A male infant wrapped in a towel was found in a closet by ambulance crews who were called by his mother, and he confirmed dead after cardiopulmonary resuscitation failed at the emergency department. His mother, who was in her 20 s, single, had no significant medical history, and gave birth to 2 children, reported that she had realized the pregnancy until 3 month before the discovery; however, she did not seek any prenatal care. She delivered the infant in the kitchen soon after the rupture of the membrane, and found the infant was not crying and motionless. Shortly after the delivery, she cut the umbilical cord with scissors, placed the placenta into a plastic bag, and put the infant in the closet. She did not remember the details of the delivery, including the presence or absence of meconium-stained amniotic fluids or coiling of the umbilical cord. Eventually, she asked an officer in a family-support facility for advice 4 days after the delivery, and then called emergency medical services. A medico-legal autopsy was performed 2 days after the discovery of the infant. A few days after the autopsy, the police investigation discovered that the mother used a stimulant not only during the pregnancy but also an hour before the rupture of the membrane on the day of the

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delivery. Details about the dosage and the frequency of the administration in the mother were unknown. There were not any independent witness of the drug abuse and the delivery.

2.2. Autopsy findings

On external examination, the body weight and height were 50.0 cm and 3.3 kg, suggesting a full-term delivery. The body showed no significant injury, except for minor injuries associated with resuscitation procedures. A number of petechiae were scattered in the palpebral conjunctiva. The umbilical cord was a total length of 64 cm long without knots or excessive torsion, pearly white, dry, and sharply cut off 6 cm from the lateral insertion in the placenta with 3 vessels. The placenta was 596 g in weight and 20.0 × 14.0 × 2.5 cm in dimensions. The membrane of the placenta was transparent, milky white with hemoglobin infiltration, and ruptured a certain distance from the parenchyma. The parenchyma of the placenta was red, beefy, and spongy without any abnormality including infarction or hematoma.

On internal examination, a number of ecchymoses were found under the scalp, and a few petechiae were visible in the visceral pleura and renal pelvis. Caput succedaneum was not observed. The lungs (left weight: 22 g, right weight: 22 g) were dark red and poorly aerated. In the hydrostatic test with the whole lungs and the sections from each lobe, the lungs and the sections sank. The hydrostatic test was also performed with the gastrointestinal tract, and the stomach and duodenum floated. Grossly, the other organs, including those of the central nervous system, digestive

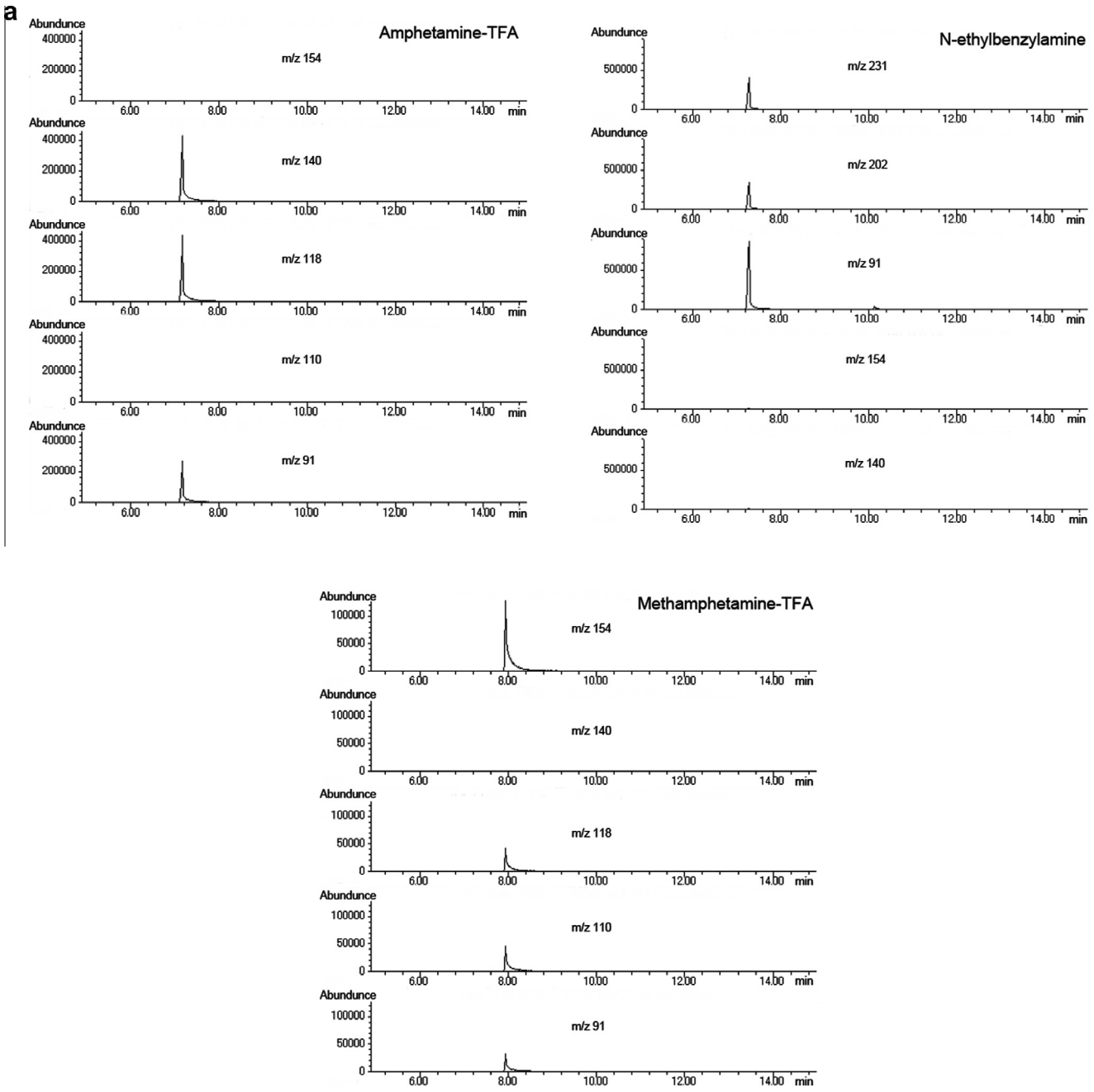

Fig. 1. (a) Mass chromatograms of the standard solutions (methamphetamine-TFA, amphetamine-TFA, and internal standard. (b) Mass chromatograms of the blood sample (insert in *m/z* 154, 140, 118, and110: magnification ×10). (c) Mass spectrum of the standard solutions and the blood sample.

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