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Detection of Methamphetamine in a Newborn Infant

Attention is now being focused on the influence of drugs in the childbearing component of the population with recognition of the morbidity associated with the heroin, methadone, and barbiturate withdrawal syndromes and the question of increased mortality in the neonate [1,2].

Although there are many accounts of the seriousness of amphetamine abuse, we are unaware of any published reports regarding the influence of amphetamine during pregnancy and on the neonate. The case reported here raises a question of the possible role of amphetamines in complications of pregnancy as well as effects on the infant.

Case Report

The mother, a 24-year-old white woman, divorced, gravida 3, para 2, with no prenatal care was admitted to the hospital in premature labor with spontaneous rupture of membranes, profuse bleeding, partial abruption of a low lying placenta, and transverse fetal position with prolapse of arm and shoulder. An emergency transverse low cervical cesarean section was performed with delivery of a 2 pound, 7½ ounce male infant measuring 37 cm, consistent with a gestational age between the 7th and 8th lunar months. The Apgar scores were 2 at one min and 5 at five min. The infant required assisted respiration for one-half h, continued with poor respiratory effort thereafter, and expired in approximately 4 h.

Postmortem examination revealed only evidence of intrauterine anoxia with squames and vernix caseosa present in the lungs and a small interparenchymal hemorrhage of the liver. In the post partum course, a suspicion of drug abuse by the mother during the pregnancy was raised, and therefore specimens of blood, liver, brain, kidney, lung, and bile were saved for toxicologic analysis.

Toxicology

Method

The blood specimen was screened for the presence of acidic, basic, and neutral drugs such as barbiturates, common tranquilizers, and glutethimide which can be detected by ultraviolet spectrophotometry and thin layer chromatography.

Blood was also screened for the presence of alkaline drugs such as propoxyphene, methadone and other synthetic narcotics, and amphetamines using gas chromatography.

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A modification of the extraction technique of Manno et al [3] was applied for this procedure. A 5 percent apiezon L column was used in a Glowall 320 gas chromatograph (Column temperature 125°C; carrier gas, nitrogen; flame ionization detector) for the amphetamine analysis [4].

The liver was hydrolyzed and analyzed for opiate narcotics by the method of Goldbaum et al [5].

Results

No barbiturates or other acidic, basic, or neutral drugs were detected by the ultraviolet and thin layer screening procedures and no opiates were detected by hydrolysis and extraction of the liver. Methamphetamine and amphetamine were detected in the blood. All the available specimens were then analyzed by the same technique with the results shown in Table 1.

TABLE 1—*Distribution of methamphetamine in a newborn infant.*

	Methamphetamine ($\mu\text{g/g}$)	Amphetamine ($\mu\text{g/g}$)
Blood	0.355	0.080
Bile	0.384	0.050
Kidney	0.746	0.080
Lung	0.857	0.120
Brain	0.280	<0.030
Liver	0.246	None detected (<0.020)

Discussion

Upon further investigation, the mother volunteered that she had been taking "diet pills" containing methamphetamine (Desoxyn[®], 15 mg) intermittently during the whole pregnancy for the purpose of suppressing weight gain and had concealed the pregnancy from prescribing physicians and co-workers. She had taken 2 or 3 per day the week before delivery and some the day before, but none the day of delivery. She denied taking any other drugs orally or any drugs by intravenous administration.

Since methamphetamine is metabolized partially to amphetamine (up to 10 percent) [6] and the latter drug is almost always detected in body specimens after ingestion of methamphetamine, the findings seem to be consistent with the history of drug usage by the mother. Most substances of small molecular weight (less than 1000) pass through the placental barrier, which means that most drugs taken by the mother also enter the circulation of the fetus [7]. The effects of these drugs on the fetus are largely unknown other than those proven to be dramatically teratogenic [8]. Most drugs taken chronically and with addiction and tolerance potential can also result in addiction in the neonate. This is now known to occur in heroin and barbiturate addicts [1,9] and methadone patients [2], requiring treatment of the baby for withdrawal. Presumably a similar phenomenon could occur with amphetamine users when the babies survive.

Dr. David Smith (Haight-Ashbury Medical Clinic, San Francisco, California) [10] in his observations and treatment of methamphetamine users has found that when pregnancy does occur, the fetus rarely survives to term. He believes this to be due to "fetal wastage" caused, in part, by malnutrition and the bizarre behavior and practices of the drug users. However, direct toxicity of the drug on the fetus and the maternal uterus cannot be overlooked as a possible causative factor in the failure to survive to term.

The present case confirms that drugs of the amphetamine group do enter the fetal circulation, and it is suggested that the presence of amphetamines may be associated with prenatal and neonatal complications.

Summary

Methamphetamine was detected during a routine toxicological examination following the autopsy of a newborn infant. Distribution of the drug in the body specimens is presented and the implications of the findings are discussed.

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