

IMPACT OF INTRAUTERINE EXPOSURE TO PHENCYCLIDINE (PCP) AND COCAINE ON NEONATES

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A total of 505 newborns who were exposed to illicit drugs during intrauterine life were studied to investigate the prevalence, growth parameters, newborn manifestations, and other effects of intrauterine exposure to cocaine and phencyclidine (PCP). The results support the hypotheses that both drugs have serious effects on growth parameters, but this effect was much more pronounced in the cocaine group than in the PCP group. Furthermore, the incidence of borderline microcephalic infants (head circumferences less than the 10th percentile) was much higher in the cocaine group. It also appears that the signs and symptoms observed in both groups are not withdrawal manifestations typically seen in narcotic-exposed infants; rather, these symptoms are true drug effects and should not be considered manifestations of drug withdrawal symptoms. (J Natl Med Assoc. 1993;85:349-352.)

Key words • fetus • neonates • cocaine
• phencyclidine (PCP)

The use of cocaine and phencyclidine (PCP) over the last 5 years has increased dramatically. In the Washington metropolitan area, a sharp rise in the use of PCP and cocaine has occurred among young black females of childbearing age. Consequently, a large number of black infants are born to drug-addicted mothers. An

earlier study¹ reported on 31 infants born to drug-addicted mothers; none of these infants had intrauterine exposure to cocaine or PCP.

This study was undertaken to investigate the prevalence, growth parameters, neonatal manifestations, and other effects of intrauterine exposure to cocaine and PCP on neonates. Furthermore, in view of the limited information available in the literature on intrauterine exposure to phencyclidine,²⁻⁴ a special effort was made to examine and compare its effects with those of cocaine.

METHODS

All babies born between January 1, 1988 and December 31, 1989 to actively addicted mothers who used drugs "regularly" during pregnancy and whose urine toxicology was positive in both mother and baby were included in the study population. Infants whose mothers admitted using drugs "regularly" throughout their pregnancy, but whose urine toxicology either was not done or negative also were included in the study population.

Mothers who admitted using one drug exclusively throughout pregnancy, which was subsequently confirmed by urine toxicology, were classified as single-drug abusers. Those admitting multiple drug use and confirmed by urine toxicology were classified as polydrug abusers.

The single-drug abusers were divided into two groups: cocaine abusers and PCP abusers. The following parameters were studied on both groups:

- status of prenatal care: classified as regular, irregular, and no prenatal care,
- urine toxicology,
- fetal growth parameters, birthweight, height, and occipitofrontal circumferences,

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Symptoms	Mild	Moderate	Severe	Day No. _____			Day No. _____			Day No. _____			Day No. _____				
				N	D	E	N	D	E	N	D	E	N	D	E		
Excessive movement	½	1	2														
Persistent crying or high-pitched cry	½	1	2														
Skin abrasions	½	1	2														
Coarse tremors	½	1	2														
Diarrhea	1	1	1														
Vomiting	1	1	1														
Excessive lip smacking or sucking on hands and fingers	1	1	1														
Frank convulsions	5	5	5														
	Total																
	Initials and Title																
Sleep pattern	Indicate with a + or - whether or not the infant is sleeping ≥2 hours at a time																
TLC response	Indicate with a + or - whether or not the infant is calmed with tender loving care (TLC)																
	Initial																

Figure. Score sheet for recording neonatal drug withdrawal symptoms. (Howard University Hospital Department of Pediatrics and Child Health, Washington, DC.)

- complete physical examination with emphasis on dysmorphic features, and
- drug withdrawal and drug effects.

A special scoring sheet (Figure) was used to examine the status of withdrawal and drug effects of cocaine and PCP. The drug withdrawal symptoms were divided into three groups: mild, moderate, and severe. The scores were recorded as 0.5 for mild, 1 for moderate, 2 for severe symptoms, and 5 for frank convulsions. Infants were

evaluated every 8 hours, and scores were documented on the “Drug Withdrawal Score Sheet” (Figure).

**RESULTS
Incidence**

During the study period, 2710 infants were born. In 1988, 211 out of 1213 (17.3%) and in 1989, 294 out of 1497 (19.6%) were exposed to illicit drugs during intrauterine life.

Status of Prenatal Care

Thirty-five percent of mothers had no prenatal care, 53% had irregular care, and only 12% had regular prenatal care.

Urine Toxicology

Urine samples were not obtained on 60 infants (12%). Of the remaining 445 infants, 22% had negative urine toxicology tests and 78% had positive tests. Cocaine, PCP, methadone, heroin, and marijuana were the most commonly used drugs. Intrauterine exposure to polydrug abuse comprised 21%, while single-drug exposure was 79%. Among single-drug abusers, 83 (21%) were in the PCP group, and 287 (73%) were in the cocaine group.

Dysmorphic Features

No special physical characteristics (ie, slanted eyes, small mandibular angle, and triangular face) were noted in either group.

Drug Withdrawal and Drug Effects

The mean withdrawal score for the cocaine group was 2.5 and 3 for the PCP group. In the cocaine group, neurological dysfunctions, ie, tremors, hypertonia, increased reflexes, and abnormal sucking and rooting reflexes, were noted most frequently. In the PCP group, symptoms were, for the most part, neurobehavioral in nature (ie, high-pitched cry, poor tracking, and decreased attention).

Intrauterine Growth Parameters

The incidence of intrauterine growth retardation was increased in both groups as determined by a chart developed at the University of Colorado Medical Center, classification of newborns by birthweight and gestational age.⁵ In the cocaine group, 158 of 287 infants (55%) had birthweight for gestational age below the 25th percentile, and in the PCP group, 35 of 83 infants (42%) had birthweight for gestational age below the 25th percentile. In the cocaine group, 140 of 287 infants (48.7%) had birth heights for gestational age below the 25th percentile, and in the PCP group, 31 of 83 (37.3%) had birth heights for gestational age below the 25th percentile.

The findings on occipitofrontal head circumferences were more striking. In the cocaine group, 195 of 287 (67.9%) had head circumference below the 25th percentile. Of these, 114 infants (30.7%) had borderline microcephaly below the 10th percentile. In the PCP group, 38 of 83 infants (45.7%) had head circumfer-

ences below the 25th percentile, 10 of whom (12%) had head circumferences below the 10th percentile.

DISCUSSION

Drug use during pregnancy is increasing at an alarming rate. Among the study population, the incidence was 17.3% in 1988 and 19.6% in 1989. A large number (88%) of these mothers did not seek any prenatal care or had limited prenatal care. Consequently, the incidence of perinatal mortality and morbidity is much higher.⁶ Both cocaine and PCP cross the placenta and enter fetal circulation. Cocaine is rapidly metabolized by plasma and hepatic cholinesterases after absorption. Cocaine is highly water and lipid soluble and has low molecular weight. Therefore, it enters the placenta by simple diffusion. Concentration of plasma and liver cholinesterases is lower in the fetus. This makes the fetus much more sensitive to smaller doses of cocaine.⁷

The results of this study indicate that while symmetrical intrauterine growth retardation occurs in both the cocaine and the PCP groups, this effect was more pronounced in the cocaine group. Placental transport in animals has shown that concentration of PCP is almost 10 times higher in the fetus than that of the mother indicating greater vulnerability to the fetus.⁸ Cocaine also has been shown to affect the growth and development of the fetus.⁹ However, the most important finding in this study was a threefold increase in the incidence of borderline microcephaly in the cocaine group compared with the PCP group.

Maternal cigarette smoking and alcohol abuse also affect fetal growth. There were no significant differences in the amount of smoking in both groups. Heavy alcohol consumption during pregnancy has been shown to produce symmetrical growth retardation.¹⁰ Thirty-eight percent of the patients in this study gave a positive history of "occasional" alcohol use during pregnancy; however, the amount of consumption in both groups was not determined, and the remainder denied alcohol use. Specific physical characteristics have been reported following intrauterine exposure to alcohol.¹¹ These features (ie, fetal alcohol syndrome) were not observed in our affected infants.

Infants born to drug-dependent mothers were evaluated every 8 hours by nurses and doctors for evidence of neurological, neurobehavioral, or physiological dysfunction (ie, vomiting, diarrhea, temperature irregularities, and sweating). There was no evidence of significant physiological dysfunction in either group. However, the cocaine group demonstrated mostly

neurological dysfunctions, while the PCP group demonstrated neurobehavioral dysfunctions.

CONCLUSION

The signs and symptoms observed in both groups (cocaine and PCP) are not the withdrawal manifestations typically seen in narcotic-exposed infants. Rather, these symptoms are true drug effects and should not be considered manifestations of drug withdrawal syndrome.

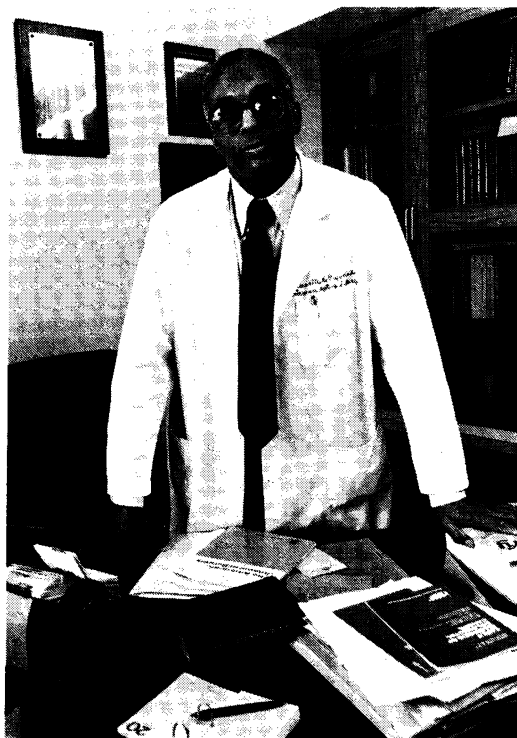
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