Cocaine Use In Pregnancy

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***Background*: Cocaine use during pregnancy has many deleterious effects on both the mother and the fetus, including the following: preterm labor (<37 weeks' gestation), congenital anomalies, intrauterine growth retardation (IUGR), abruptio placenta, low-birth-weight infants (<2500 g), neonatal death, and sudden infant death syndrome (SIDS). Potentially catastrophic maternal outcomes include a pre-eclampsia-like syndrome, acute pulmonary edema, seizures, cardiac arrhythmia, and sudden death. Family physicians who practice obstetrics might encounter cocaine-abusing women as part of their primary care practice. This article reviews the current knowledge regarding the pharmacology, pathophysiology, prevalence, demographics, and methods of detecting cocaine use in pregnancy.**

***Methods*: Material for this paper came from a MEDLINE review of the literature from 1988 to the present.**

***Results and Conclusions*: Family physicians who practice obstetrics, especially those who practice in urban minority settings, are likely to encounter pregnant women who are abusing cocaine. Signs of maternal cocaine use are dilated pupils and increased heart rate, blood pressure, respirations, and reflexes. Other signs include agitated sensorium, arrhythmias, and seizures. Preterm labor, pre-eclampsia, and acute pulmonary edema can all be caused by maternal cocaine use. Methods of testing for cocaine are urine or meconium drug screening. Hair analysis is presently being researched but is not yet at a level of clinical reliability. Getting the patient into prenatal care as early as possible has been shown to improve birth outcomes. (J Am Board Fam Pract 1994; 7:225-8.)**

Cocaine addiction is a chronic, relapsing disease that has reached epidemic proportions in the US population,[1-6] and family physicians who practice obstetrics might encounter this problem as part of their general practice. This article reviews the current literature regarding the detection, diagnosis, and clinical aspects of maternal cocaine use.

Methods

Using the key words "cocaine," "pregnancy complications," and "pregnancy outcomes," the MEDLINE files were searched through the CD ROM system from 1988 to the present. Articles dating before 1988 were accessed from cross-reference of the more recent articles.

Problems Associated with Cocaine Abuse

The mother who is abusing cocaine has at least two problems. One is the effects of the cocaine itself, and the other is the problem of addiction. The problem of addiction manifests itself in polydrug use. For example, a study at Harlem Hospital in New York City, where there has been a special prenatal care program for addicted pregnant women since 1985, found that 13 percent of all the babies born in the hospital were exposed to cocaine in utero; at least one-third of these mothers used crack as their primary drug of choice, 15 percent used opiates, 41 percent used alcohol, and 83 percent smoked cigarettes.[7] Cocaine and other drug use is often accompanied by other medical problems,[8] as indicated in Table 1.

Pharmacologic and Pathophysiologic Results of Cocaine Abuse

Knowledge of the pharmacologic effects of cocaine abuse and of the effects of cocaine on physical functioning can aid a physician in recognizing patients who abuse cocaine. Pharmacologically, cocaine is a very powerful central nervous system (CNS) stimulant that works by blocking the uptake of catecholamines at the nerve endings. In the mother this blockage results in increased peripheral catecholamines, which, in turn, can cause the following physical findings: dilation of pupils; increased heart rate, respirations, blood pressure, and reflexes; agitated sensorium; anorexia; arrhythmias; and seizures (Table 2). The signs and symptoms

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Table 1. Problems Associated with Cocaine Use in Pregnancy.

Polydrug use
Poor nutrition
Poverty
Sexually transmitted diseases
Hepatitis B infection
Infection with human immunodeficiency virus
Dysfunctional family systems
Present or previous abuse (physical, emotional, and sexual)
Poor self-esteem

of cocaine withdrawal include muscle aches, abdominal pain, hunger, sleepiness, and depression (Table 2).

Cocaine also affects the pregnancy through this catecholamine-mediated effect by causing vasoconstriction and increased uterine contractility in the mother. These conditions can result in premature labor, abruptio placenta, and decreased placental blood flow. Decreased placental blood flow in turn results in fewer nutrients and less oxygen getting to the fetus, and these factors cause intrauterine growth retardation (IUGR).

At the same time cocaine easily crosses the placental barrier, directly altering the central neurotransmitter state and increasing peripheral catecholamines in the fetal circulation. These changes result in increased blood pressure and the end product can be intracranial hemorrhage and focal cerebral ischemic injury or stroke.[9] In addition, cocaine affects the regulation of respiration in the fetus, a condition that is believed to cause the increased incidence of sudden infant death syndrome (SIDS) sometimes seen in cocaine-exposed infants.[10] The deleterious effects of cocaine on the fetus thus include low birth weight, IUGR, congenital anomalies, cerebral hemorrhage, stroke, and an increased risk for SIDS (Table 3).[1,9-15]

Table 2. Signs and Symptoms of Maternal Cocaine Use and Withdrawal.

Cocaine Use	Cocaine Withdrawal
Dilated pupils	Muscle aches
Increased heart rate	Abdominal pain
Increased blood pressure	Hunger
Increased respirations	Sleepiness
Increased reflexes	Depression
Agitated sensorium	
Arrhythmias	
Seizures	

The pharmacologic effects of cocaine use can also cause disastrous obstetric and personal consequences for the pregnant woman. In addition to the possibility of spontaneous abortion and abruptio placenta mentioned earlier, the mother can also experience premature rupture of membranes, preterm delivery, pre-eclampsia-like syndrome, pulmonary edema (cocaine bronchiolitis), cardiac arrhythmias, seizures, and sudden death (Table 4).

Of all these conditions, it is especially important to recognize that a pre-eclampsia-like syndrome with hypertension, edema, and proteinuria can be caused by cocaine. Because true pre-eclampsia will not improve with time and because delays in treatment threaten both the life of the mother and the fetus, the standard treatment for pre-eclampsia is to stabilize the patient and deliver the baby no matter what its gestational age. On the other hand, the pre-eclampsia-like syndrome that occurs as a result of acute cocaine intoxication will spontaneously resolve in 8 to 12 hours. It is therefore imperative that all patients presenting with pre-eclampsia have a urine drug screening test.

Acute pulmonary edema or cocaine bronchiolitis is also a very serious condition. The treatment is supportive therapy in an intensive care unit. Unfortunately, despite maximal therapy, the maternal mortality rate for cocaine bronchiolitis is approximately 33 percent. Any pregnant patient presenting with pulmonary symptoms should therefore also have a urine drug screening test.

Because cocaine is a major cause of preterm labor, this condition also requires drug screening. In summary, all patients who are seen with pre-eclampsia, preterm labor, or pulmonary edema should be screened for cocaine use. It is also prudent to consider screening patients with premature rupture of membranes and those whose infants exhibit IUGR, congenital anomalies, and unexplained birth asphyxia.

Detection, Prevalence, and Demographics

There are three generally accepted basic methods to detect drug use: directly interviewing a patient about drug use or having a patient complete a drug survey instrument, urine drug screening, and meconium drug screening using gas chromatography. Both questioning of the patient directly

Table 3. Effects of Maternal Cocaine Use on the Fetus.

Low birth weight
Intrauterine growth retardation
Congenital anomalies
Cerebral hemorrhage
Stroke
Increased risk for sudden infant death syndrome

and having the patient fill out a survey questionnaire about drug use are notoriously unreliable.[2,6,16,17] Urine drug screening, on the other hand, is very reliable if positive, but it will detect cocaine in the urine only if the drug was ingested within 4 days of the collection of the sample.[18] The advantage to urine drug screening is that it can be done at any time during the pregnancy. Meconium drug screening is the most reliable of all the tests because it will detect cocaine exposure to the fetus for up to 6 weeks before birth.[4] Its main disadvantage is that it can be done only after the baby is born.

Because the window of detection for cocaine in the urine is only about 96 hours and that in meconium is only about 6 weeks, hair has been proposed as a medium for evaluating long-term cocaine use. Hair grows at approximately 1.0 to 1.5 cm a month; thus, a 10- to 15-cm strand could detect drug use throughout the entire pregnancy.[19] Many issues need to be resolved before this procedure enters the clinical laboratory, however. Chief among them are dose (Is infrequent use distinguishable from frequent use?), stability (Will passive exposure to smoke cause a false-positive reading, and will use of dyes, bleaches, and other chemicals affect detection rates?), and complexity (How reproducible are assays involving nanogram quantities of metabolite?).[20]

Studies from inner-city populations show an incidence typically in the range of 6 percent to 9 percent in selected urban areas,[1,2] but it was 13 percent in Harlem[8] and 31 percent in a study based on meconium.[4] A study in rural Minnesota, however, revealed cocaine use to be only 0.1 percent.[21] This dichotomy between rural and urban populations was confirmed in a statewide, population-based study of all births in South Carolina in 1991.[5] Cocaine use was significantly higher in metropolitan areas, 5.7 times higher in African-American women than in white women, and occurred most frequently in women aged 25 to 34 years. Whereas marijuana tends to be the drug of choice in the teen-age and younger age population, cocaine was more prevalent in women in their late 20s and early 30s. Cocaine abuse in pregnancy thus tends to be a disease of poor, minority women in large urban areas who are in their late 20s and early 30s.

Table 4. Effects of Cocaine Use on the Mother.

Spontaneous abortion
Preterm delivery
Premature rupture of membranes
Abruptio placenta
Pre-eclampsia-like syndrome
Pulmonary edema (cocaine bronchiolitis)
Seizures
Cardiac arrhythmias
Sudden death

Conclusions

Family physicians who practice obstetrics might encounter cocaine-abusing pregnant patients. Cocaine use in pregnancy is associated with polydrug use, cigarette smoking, alcohol abuse, sexually transmitted diseases, and the human immunodeficiency virus. Cocaine, through its action as a powerful CNS stimulant, can cause seizures, arrhythmias, hypertension, pulmonary edema, and sudden death in the mother and prematurity, IUGR, congenital anomalies, stroke, and SIDS in the infant. Cocaine can be detected in urine for up to 96 hours and in meconium for up to 6 weeks. Hair analysis might hold some promise for detecting cocaine use throughout the entire pregnancy, but it is not yet clinically useful. Getting a patient into prenatal care has been shown to improve birth outcomes.[13,22]

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