

Smoking During Pregnancy Tied to Childhood Obesity

BY BRUCE JANCIN
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DALLAS — Smoking while pregnant is associated with overweight in offspring, Dr. Nicholas Stettler reported at the annual scientific sessions of the American Heart Association.

His retrospective analysis of prospectively collected prenatal and postnatal data on 20,284 women in the Collaborative Perinatal Project showed that after a host of potential confounding variables were controlled for, white women who smoked in pregnancy were 33% more likely than those who didn't to give birth to a child whose body mass index was at or above the 95th percentile at age 7 years. Black smokers were 39% more likely than non-smokers during pregnancy to have an overweight 7-year-old, added Dr. Stettler of Children's Hospital of Philadelphia.

"In utero exposure to smoking may result in metabolic programming that leads to the development of obesity," Dr. Stettler said. "Smoking prevention and cessa-

tion in women of childbearing age may have unintended benefits, such as reduced risk for obesity in their offspring."

The Collaborative Perinatal Project was conducted at 12 U.S. sites during 1959-1973. Overall, 45% of participating mothers reported smoking during their index pregnancy. Among the potential confounders Dr. Stettler controlled for in his analysis were maternal age, body mass index, and education level, along with the child's gender, birth weight, gestational age, birth order, and weight gain during the first 4 months of life.

The maternal smoking/overweight offspring association appeared to be dose dependent. For every 10 cigarettes per day a black woman smoked during pregnancy, the chances of her child being overweight at age 7 climbed by 21%. Similarly, the risk increased among white women by 18% for every 10 cigarettes per day.

The study findings underscore the manner in which cardiovascular risk factors cluster within families and across the generations, Dr. Stettler noted. ■

Maternal Malnutrition, Smoking Raise Fetal Gastroschisis Risk

ST. PETE BEACH, FLA. — Young pregnant women who smoke cigarettes or marijuana, or who are malnourished, have a significantly increased risk of having an infant with gastroschisis, a case-control study suggests.

Those who have both risk factors have an even greater risk of having an infant with this severe birth defect, Phung Kim Lam, Ph.D., reported at the annual meeting of the Teratology Society.

Dr. Lam studied 55 infants with gastroschisis and 94 age-matched controls. Maternal information was based on interviews and food-frequency questionnaires. Mothers were considered to have high carbon monoxide (CO) exposure if they smoked at least one pack of cigarettes dai-

ly near the time of conception or if they smoked marijuana habitually around that time.

On multiple conditional logistic regression, gastroschisis was associated with high CO exposure (odds ratio 2.64) and low animal protein intake (OR 2.45), said Dr. Lam of the University of California, San Diego.

Young mothers with high CO exposure but without low body mass index (less than 22 kg/m²) were more likely than controls to have a baby with gastroschisis, as were those with low BMI and no CO exposure. The finding was much more marked in those with both low BMI and high CO exposure, compared with controls, she said.

—Sharon Worcester

DATA WATCH

Percentage of Women Who Use Folic Acid Daily



Note: Based on a Gallup Poll national survey of about 2,000 women aged 18-45 years.
Source: March of Dimes

DRUGS, PREGNANCY, AND LACTATION

Hair Testing and Drug Exposure

A recently published study on recreational drug use during pregnancy and the possible link to fetal gastroschisis highlights an increasingly important area of research: hair testing as a biomarker for pregnancy exposure to recreational drugs or drugs of abuse. Our laboratory is one of several sites in North America with expertise in measuring these substances in hair, an area many obstetricians may not be aware of.

Clearly, it can be difficult to determine the types of chemicals or drugs a fetus may have been exposed to by relying on what a woman says she took during her pregnancy. Forensic science has provided us with a great deal of help in this area.

Forensic scientists have known for some time that drugs taken by an individual are grown into the hair, and do not go away. The first use of this technology was to detect long-term exposure to heavy metals. Over the last 15-20 years, more drugs of abuse have been determined to grow into adult hair, including cocaine, heroin, marijuana, LSD, amphetamine, and methamphetamine. In 1988, we determined that the same is true for the baby. Because the hair present at birth grows during the last 3 months of gestation, an analysis of a baby's hair can provide information on possible drug exposure during that time. We have now shown this is true for almost every drug of abuse, as well as nicotine.

With babies, the same substances can also be measured in meconium, and exposure can be traced to as early as 14 weeks' gestation, when meconium begins to form. Hair and meconium testing have become quite routine in certain settings in North America, with the predominant use among child protection agencies or children's aid societies. This testing is also used for research and clinical purposes and by neonatologists, pediatricians, and other health care professionals who have a medical reason to test, often in the context of diagnosing issues in the child, and when maternal consent is provided. For such studies to be conducted, the guardian's consent is needed; sensitive attitudes and high ethical standards need to be practiced.

It's possible to use meconium analysis to test for excessive maternal alcohol intake by measuring fatty acid ethyl esters, conjugates of alcohol with fatty acids, which stay in the meconium of the baby. Recent work from investigators in Berlin determined that fatty acid ethyl esters can also be measured in the hair of the parents. Animal studies indicate they can be measured in a baby's hair, which is being investigated

in human studies that are underway.

Analyzing hair samples provides an opportunity to look, not just at one sample of urine or blood that represents the last day or so of exposure but, rather, long-term exposure. At our laboratory, we use hair testing to determine when exposure occurred, which eliminates the uncertainties when this information is obtained from the individual.

Last year we published a review (Clin. Biochemistry 2004;37:429-38) that discussed hair and meconium testing to confirm the prenatal use of alcohol and tobacco. It is important for clinicians to recognize that positive neonatal or meconium tests for drugs of abuse are strong evidence for maternal addiction, as these drugs have been used long after the mother knew that she had conceived.

In a study conducted at the Motherisk laboratory published in 2003 (Arch. Dis. Child. Fetal Neonatal Ed. 2003; 88:F98-F100), we found that meconium was somewhat more sensitive than hair samples of newborns for detecting cocaine and cannabis, and found a significant correlation between hair and meconium levels of cocaine, cannabis, and opiates. We concluded that both methods were useful biologic markers of illicit drug exposure in utero and also useful in suspicious cases where the neonatal urine test is negative.

In the recent gastroschisis study, investigators used maternal hair analysis from samples taken between 14 and 33 weeks' gestation in 22 pregnant women with a fetus diagnosed with the disorder and in 25 pregnant women with a normal fetus (BJOG 2005;112:1022-5).

Although the study is small and therefore cannot establish an association, it marks the first time that "objective measurements of maternal intake of recreational drug compounds at these critical periods of development for the fetus have been carried out," as the researchers noted.

This effort should be welcomed. Clearly, hair testing can be a very powerful tool in these studies and in individual cases to help determine whether a woman is using drugs.

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