PCBs in Breast Milk

Committee on Environmental Health

Environmental chemicals have been found in human milk since the 1950s, and periodically there are reports of polychlorinated biphenyls (PCBs) in breast milk. Polychlorinated biphenyls are stored in body fat and are not readily excreted except in the fat of breast milk. PCB manufacture ceased in the US in the 1970s.

The routes of PCB exposure for the general population are not known in detail, but low-level contamination of food is a likely source. Persons who consume fish from contaminated waters, such as the Hudson River and Lake Michigan, may have greater exposure to PCBs. Opportunity still exists for skin to come in contact with and absorb PCBs from old electrical or laboratory equipment.

BACKGROUND

Studies in the US

In the US there are no known clinical effects of exposure to PCBs through breast milk. Two cohorts of US children—one in Michigan with about 250 children and the other in North Carolina with about 750 children—whose development was followed from birth had their exposure to PCBs measured. In the North Carolina study, prenatal exposure to PCBs but not exposure through breast milk was associated with poorer performance on the Psychomotor Index from the Bayley Scales of Infant Development from 6 months through 24 months of age.12 In the Michigan study, poorer visual recognition memory performance in 7-month-old infants was associated with cord serum PCB level and maternal contaminated fish consumption.3 There was no relation with breast milk exposure.

Studies in Asia

"Yusho" and "yucheng" both mean oil disease in Japanese and Chinese, respectively. Both were epidemics of chronic food poisoning from cooking oil contaminated with a complex mixture of PCBs, polychlorinated terphenyls, quaterphenyls, and dibenzo-furans. In Japan, infants born to women who had consumed contaminated oil were small for gestational age, had dark pigmentation of the skin and nails, early eruption of teeth, and swollen eyelids and gums. Four children followed up at 8 to 19 months of age were described as essentially normal mentally and physically.4 In another part of Japan, however, 13 exposed children were described clinically as dull, apathetic, and hypotonic, with IQs in the 70s.5 At least some of these cases involved only exposure through breast milk.

In Taiwan, 117 children born between 1978 and 1985 to women who had yucheng were examined.6 Although maternal exposure had ceased by 1979, the children continued to weigh less and were more likely than neighborhood controls to have hyperpigmentation of the nails and gums, nail deformities, diffuse dark pigmentation on skin and mucous membranes, and bronchitis. There was an overall clinical impression of developmental or psychomotor delay more frequently in the exposed children. Only a weak association existed between the ectodermal defects, developmental delay, and history of breastfeeding.7 The developmental deficits of these children remained mostly unchanged after a follow-up of 7 years. Children born up to 6 years after the exposure (ie, in 1985) were as affected as those born soon after (ie, from 1979 to 1980) when tested at the same ages.8

Other Sources of Exposure

No one, including women in their reproductive years, should be exposed to PCBs. However, if most people encounter these contaminants in small daily exposures over a lifetime, then short-term dietary changes, such as those made during pregnancy, likely make little difference in fetal exposure. The amount of PCBs permitted in commercial foods in the US, including fish, is regulated.

Advice concerning the consumption of fish caught by anglers (rather than commercial fish) that have been published by regional health authorities should be followed. Advisories concerning PCB levels are generally available from the health, natural resources, or environmental staff where the problem exists.

Unless a woman has a history of occupational exposure or other unusual exposures to PCBs, she should not be discouraged from breast-feeding because of the presence of PCBs in her milk. There are no normal values or standardized laboratory tests, and the sensitivity of the available analytical tests is such that PCBs would be detected in the milk fat of a majority of women. The fact that levels of PCBs in breast milk may exceed the standard levels acceptable for infant food, however, presents clinicians and public health authorities with a dilemma—encouraging breast-feeding but discouraging the consumption of tainted food.
Two US states and Canada\textsuperscript{8-11} recommended that women consider having their milk tested and avoid or curtail breast-feeding if the levels of PCBs are "high," usually at the action level for infant foods. Simultaneously, other organizations have endorsed breast-feeding despite the presence of residues.\textsuperscript{12} Commercial formula and cow's milk have little or none of these chemicals. However, the decrease in infant mortality among breast-fed infants outweighs (although slightly) the current best estimate of the small excess risk of cancer to the child, even for women at the 95th percentile of PCB levels who breast-feed for a long time.\textsuperscript{13}

\section*{COMMENT}

Polychlorinated biphenyls were introduced and dispersed with little thought about environmental contamination; despite being banned, they will remain a problem for decades. Currently, the degree of environmental contamination has no feasible solution, even if unlimited funds were available.

\section*{RECOMMENDATIONS}

The AAP recommends breast-feeding as the preferred form of nourishment for infants up to 1 year of age. In unusual circumstances, the advice of state or provincial health department officials who are aware of the PCB problems in those regions where high exposures have occurred should be sought.

The AAP does not recommend testing breast milk for PCBs for the following reasons: 1) laboratories do not have standard procedures for the test and 2) although most women have detectable levels of PCBs, there are no established "normal" or "abnormal" values for clinical interpretation.

Fish advisories concerning PCB contamination need to be followed. The nutritional state of the pregnant woman or mother who is breast-feeding, however, should not be compromised to protect her against relatively low levels of PCBs.

\section*{REFERENCES}
