Prenatal and postnatal bisphenol A exposure and asthma development among inner-city children

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Abstract

Background

Bisphenol A (BPA) is used widely to manufacture food container linings. Mouse models suggest exposure to BPA might increase allergic inflammation.

Objectives

We hypothesized that BPA exposure, as assessed based on urinary BPA concentrations, would be associated with increased odds of wheeze and asthma and increased fraction of exhaled nitric oxide (FeNO) values in children.

Methods

The Columbia Center for Children's Environmental Health recruited pregnant women for a prospective birth cohort study (n = 568). Mothers during the third trimester and children at ages 3, 5, and 7 years provided spot urine samples. Total urinary BPA concentrations were measured by using online solid-phase extraction, high-performance liquid chromatography, isotope-dilution tandem mass spectrometry. Wheeze in the last 12 months was measured by using questionnaires at ages 5, 6, and 7 years. Asthma was determined by a physician once between ages 5 and 12 years. FeNO values were measured at ages 7 to 11 years.

Results

Prenatal urinary BPA concentrations were associated inversely with wheeze at age 5 years (odds ratio [OR], 0.7; 95% CI, 0.5-0.9; P = .02). Urinary BPA concentrations at age 3 years were associated positively with wheeze at ages 5 years (OR, 1.4; 95% CI, 1.1-1.8; P = .02) and 6 years (OR, 1.4; 95% CI, 1.0-1.9; P = .03). BPA concentrations at age 7 years were associated with wheeze at age 7 years (OR, 1.4; 95% CI, 1.0-1.9; P = .04) and FeNO values (β = 0.1; 95% CI, 0.02-0.2; P = .02). BPA concentrations at ages 3, 5, and 7 years were associated with asthma (OR, 1.5 [95% CI, 1.1-2.0]; P = .005; OR, 1.4 [95% CI, 1.0-1.9]; P = .03; and OR, 1.5 [95% CI, 1.0-2.1]; P = .04, respectively).

Conclusions

This is the first report of an association between postnatal urinary BPA concentrations and asthma in children.

Key words: Bisphenol A, asthma, wheeze, children, exhaled nitric oxide, IgE, cohort study

Abbreviations used:

BPA (Bisphenol A), FeNO (Fraction of exhaled nitric oxide), OR (Odds ratio), QC (Quality control)
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