Within-person variability of urinary Bisphenol-A among postmenopausal women

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Purpose

Bisphenol-A (BPA) is an endocrine-disrupting chemical that is ubiquitous in our environment and may have carcinogenic effects. Exposure to BPA occurs primarily through leaching of BPA from plastic containers and cans into foods that are then ingested. BPA is metabolized quickly, with 50% excreted after 6 hours. We sought to evaluate the distribution and within-person variability of urinary BPA levels over repeated samples collected 1-3 years apart.

Methods

Within each of three Women's Health Initiative (WHI) sites with stored urine samples, we randomly selected 15 women from the observational study (OS) and 15 women from the clinical trial (CT) who were free of incident cancer, stroke, or coronary heart disease through year 3 of follow-up. Total BPA was measured in samples collected at baseline, year 1 (CT participants only), and year 3 using high performance liquid chromatography with tandem mass spectrometry. We calculated the median and interquartile range for BPA measures at each time point separately by cohort. We also calculated the intra-class correlation coefficient and the within-person concordance of BPA quartile at each time point.

Results

The median (25th-75th percentile) of total BPA at baseline was 3.5 (2.4-5.4) ng/mg creatinine for the OS and 3.15 (2.4-4.4) ng/mg creatinine for the CT. Median total BPA was variable across years for the OS (4.3 ng/mg creatinine, 3.1-6.3 at year 3; p=0.05 vs. baseline) but not the CT (2.9 ng/mg creatinine, 1.9-4.3 at year 1 and 2.6 ng/mg creatinine, 2.0-4.4 at year 3; p=0.74 baseline vs. year 1; p=0.13 baseline vs. year 3; p=0.46 year 1 vs. year 3). The intra-class correlation coefficients was 0.09 (95% CI 0.01-0.44) for the combined sample. Concordance of total BPA quartile was 24.4% for the OS between baseline and year 3 and 37.8%, 24.4%, and 37.8% among the CT between baseline and year 1, year 1 and year 3, and baseline and year 3, respectively.

Conclusions

Total BPA levels in this cohort of postmenopausal women were similar to those found in other cohorts and suggest a range of exposure both within and across participants. Urinary BPA levels for an individual may vary substantially over time, suggesting that a single measurement of BPA may not adequately capture true exposure in epidemiological studies.
Presenter:

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