

Prenatal Exposure to Organophosphate Pesticide and Fetal Growth

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Abstract : Organophosphate pesticides (OPs) is an environmental hormone with proven endocrine-disrupting effects that may affect the growth and development in human. A large amount of organophosphate pesticides (OPs) is used throughout Taiwan, and human may be exposed through dietary intake or residential use. During pregnancy, OPs can be transferred to the blood stream reaching the fetus through the placenta. The aim of this study was to explore the association between maternal OPs exposure levels and fetal developments and birth outcomes. A birth cohort was follow-up. Maternal urine sample were collected at the first, second, and third gestational trimester. Fetal growth characteristics were measured by ultrasonic scan and birth outcomes were assessed by pediatrician. Urinary metabolite of organophosphate pesticides were assessed using gas chromatography-mass spectrometry. The analytes included dimethylphosphate (DMP), dimethylthiophosphate (DMTP), dimethyldithiophosphates (DMDTP), diethylphosphate (DEP), diethylthiophosphate (DETP), and diethyldithiophosphate (DEDTP). We found that all of urine samples in each trimester were detected at least one metabolite for dialkyl phosphate (DAP). The detection rate range of OP urinary metabolites were from the lowest 22% DEDTP to the highest 100% DMP and DMTP. And to compared geometric means (GM) of urinary metabolites with three trimesters, that third trimester had the highest concentration for DMPs, DEPs, and DAPs in pregnant women were 368.01, 169.85 and 543.75 nmol/g creatinine, respectively. We observed that DAPs concentration in first and second trimester were significantly negative association with head circumference. DMPs in first trimester was significantly negative association with thoracic circumference ($p=0.05$) by spearman correlation. Our results support associations with prenatal OPs exposure with fetal head circumference and thoracic circumference. It provided that maternal OPs exposure might affect birth outcomes. Thus, prenatal exposure to OPs and health risk worthy of attention and concern.

Keywords : DAPs, birth outcomes, organophosphate pesticides, prenatal

Conference Title : ICBCM 2016 : International Conference on Biomarkers and Clinical Medicine

Conference Location : Paris, France

Conference Dates : May 16-17, 2016