ASSOCIATION OF DIABETES WITH ARSENIC EXPOSURE, ARSENIC METABOLITES AND AS3MT POLYMORPHISM

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Background and Aims. Exposure to inorganic arsenic (iAs) is suspected of causing diabetes mellitus and other diseases. This study examined associations of diabetes with exposure to iAs in drinking water, metabolites of iAs in urine and AS3MT polymorphism.
Methods. Participants were adults and children age • 5 years living in Durango-Coahuila and Hidalgo states, Mexico. Information on water used and residential and medical history was obtained by questionnaire and participants provided samples of drinking water and spot urine. Prevalent diabetes was classified by fasting blood glucose (FBG) (≥125 mg/dl), oral glucose tolerance test (OGTT) (≥200 mg/dl) and self-report of diabetes diagnosis or treatment. iAs and its metabolites in urine were analyzed by hydride generation-atomic absorption spectroscopy. Associations between diabetes and iAs and urinary metabolites of iAs were estimated by logistic regression with adjustment for age, sex, hypertension and obesity. Urinary creatinine was evaluated as a covariate in analyses of urinary metabolites of iAs.
Results. Odds ratios (ORs) for diabetes classified by FBG and OGTT were similar. The OR increased about 1% per ppb of As in water (95% CI 1.01-1.02). Diabetes was associated with current iAs exposure, but cumulative arsenic exposure, or with total urinary arsenic concentration or total tri- or pentavalent iAs in urine. However, the OR for urinary dimethyl-As^{III} was 1.07 (95% CI 1.01-1.13) per ng As/ml after adjustment for creatinine (1.05 without adjustment). Neither methyl-As^{III} nor pentavalent methylated arsenicals in urine were associated with diabetes. Met287Thr polymorphism was associated with FBG • 126 mg/dl (OR = 2.36) and OGTT • 200 mg/dl (OR = 2.86), although neither association was statistically significant.
Conclusions. This study links diabetes with exposure to iAs and is the first to suggest that the dimethyl-MAs^{III} may be a marker of risk of developing diabetes.