

Urinary levels of inorganic and organic arsenic metabolites among residents in an arseniasis-hyperendemic area in

Taiwan

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摘要

Abstract

In order to elucidate whether urinary levels of inorganic and organic arsenic metabolites are associated with previous exposure to high-arsenic artesian well water, a total of 302 residents of age 30 yr or older were recruited from three arseniasis-hyperendemic villages in Taiwan. Most study subjects had stopped consuming high-arsenic artesian well water for more than 20 yr. The mean total arsenic (Ast) determined by inductively coupled plasma mass spectrometer (ICPMS) was 267.05 +/- 20.95 microg/L, and the mean level of inorganic arsenic and its metabolites (Asi) was 86.08 +/- 3.43 microg/L. In the multivariate analysis, urinary dimethylarsinic acid (DMA) levels were significantly inversely associated with age, with women exhibiting significantly lower urinary amounts of arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid (MMA), organic arsenic (Aso), and Ast compared to men. After adjustment for age and sex, previous cumulative arsenic exposure through consumption of artesian well water was significantly associated with elevated urinary levels of MMA and DMA, but not As(III) + As(V), Aso and Ast. In the multivariate analysis, the percentage of Aso in Ast was significantly higher in men than women, but this was not significantly associated with age. The percentage of As(III) + As(V) in Asi increased significantly with age, while the reverse was noted with DMA in Asi. Women had a significantly higher DMA percentage but lower As(III) + As(V) and MMA percentages in Asi than men. After adjustment for age and sex, the percentages of As(III) + As(V) in Asi were significantly inversely associated with previous arsenic exposure through consumption of artesian well water. Data suggested that women seem to possess a more efficient arsenic methylation capability than men, and aging

diminishes this methylation capability; furthermore, the higher the cumulative arsenic exposure, the greater is the body burden of inorganic arsenic, mainly in the form of MMA and DMA.