

**Urinary Arsenic Methylation Capability and Carotid  
Atherosclerosis Risk in Subjects Living in  
Arsenicosis-Hyperendemic Areas in Southwestern Taiwan**

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摘要

**Abstract**

Long-term exposure to inorganic arsenic from artesian drinking well water is associated with carotid atherosclerosis in the Blackfoot Disease (BFD)-hyperendemic area in Taiwan. The current study examined the arsenic methylation capacity and its risk on carotid atherosclerosis. A total of 304 adults (158 men and 146 women) residing in the BFD-hyperendemic area were included. The extent of carotid atherosclerosis was assessed by duplex ultrasonography. Chronic arsenic exposure was estimated by an index of cumulative arsenic exposure (CAE) and the duration of artesian well water consumption. Urinary levels of inorganic arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMA(V)] and dimethylarsinic acid [DMA(V)] were determined by high performance liquid chromatography linked on-line to a hydride generator and atomic absorption spectrometry (HPLC-HG-AAS). The percentage of arsenic species, primary methylation index [ $PMI = MMA(V) / (As(III) + As(V))$ ] and secondary methylation index [ $SMI = DMA(V) / MMA(V)$ ] were calculated and employed as indicators of arsenic methylation capacity. Results showed that women and younger subjects had a more efficient arsenic methylation capacity than did men and the elderly. Carotid atherosclerosis cases had a significantly greater percentage of MMA(V) [%MMA(V)] and a lower percentage of DMA [%DMA(V)] compared to controls. Subjects in the highest two tertiles of PMI with a median of CAE >0 mg/L-year had an odds ratio (OR) and a 95% confidence interval (CI) of carotid atherosclerosis of 2.61 and 0.98-6.90 compared to those in the highest two tertiles of PMI with a CAE=0 mg/L-year. We conclude that individuals with greater exposure to arsenic and lower capacity to methylate inorganic arsenic

may be at a higher risk to carotid atherosclerosis