Mercury accumulation and progression of carotid atherosclerosis: the prospective 11-year follow-up study in men in eastern Finland

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BACKGROUND AND PURPOSE OF THE STUDY

The oxidation of LDL in the human body has been shown to accelerate atherosclerosis and subsequently increase the risk of cardiovascular disease (CVD). Mercury can promote the oxidation of lipids and it can also counteract the antioxidative effects of selenium. Thus, it can have negative effects on cardiovascular health.

However, the knowledge about the effects of mercury on CVD is limited. We have previously shown on a prospective Kuopio Ischaemic Heart Disease Risk Factor (KIID) Study that high hair methylmercury content is associated with increased risk of CVD mortality and morbidity and progression of atherosclerosis (Nerreaho et al., 2018). This study was to reassess our earlier findings from the 4-year follow-up of the cohort about the progression of atherosclerosis.

RESULTS

The total dietary mercury content in men was 0.4 mg (SD 1.8) in 1984-1989 and 1.2 mg (SD 1.8) in 2004-2005 on the 11-year re-examinations.

The total dietary mercury content in men was 0.6 mg (SD 1.8) in 1984-1989 and 1.2 mg (SD 1.8) in 2004-2005 on the 11-year re-examinations.

For each 1 µg increase in mercury content, there was an average 11-year increment of 7 µg (95% CI 0.1-18) in the mean CCA-IMT and 12 µg (95% CI 0.3-21) in the maximal CCA-IMT. Adjustment for lead, red cell folate, C-reactive protein, adiponectin, and serum uric acid did not change the results.

In the 11-year re-examinations of the KIID Study, CCA-IMT was associated with an average 6 µg (95% CI 0.1-12) greater mean CCA-IMT and 12 µg (95% CI 0.2-24) greater mean CCA-IMT in men. The men with mercury was not associated with reduced in mean CCA-IMT (mean decrease 1 µg, 95% CI -9 to 22).

The cumulative content of weekly fish intake and fish mercury was 0.31 (95% CI 0.17, 0.45) in men on the baseline and 1.17 (95% CI 0.70, 1.82) in women on the 11-year re-examinations, respectively, and 0.37 (95% CI 0.18, 0.64) in women.

CONCLUSIONS

High hair content of mercury is associated with early stages of atherosclerosis in men but not in women.

The current data confirm our previous findings that high hair content of mercury, independent of fish intake, is associated with increased progression of atherosclerosis and subsequently risk of CVD morbidity and mortality in middle-aged healthy men from Eastern Finland.

Regular fish consumption of large predatory fish from lakes with high mercury content should be avoided.