

MERCURY, THYROTROPIN, AND THYROID AUTOANTIBODIES IN U.S. WOMEN, USNHANES 2007-2008

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Background and Aims: Mercury accumulates in the thyroid gland, and mercury exposure has been associated with cellular autoimmunity. Elevated thyrotropin coincident with positive thyroid autoantibodies has strong predictive value for hypothyroidism, a disorder more prevalent among women and most commonly caused by autoimmune thyroiditis. The association between thyrotropin, thyroid autoantibodies, and mercury has not been evaluated in epidemiologic studies.

Methods: Data on mercury, thyrotropin, thyroglobulin autoantibodies (TgAb), thyroid peroxidase autoantibodies (TPOAb), and urine iodine (UI) were obtained from the 2007-2008 US National Health and Nutrition Examination Survey files for adult women (n=31,874). We used multiple logistic regression to evaluate the association between mercury and elevated thyrotropin coincident with thyroid antibody positivity in younger (20-59 years) and older (60+ years) women, adjusted for demographic factors, nutrient intake, UI, and stratified by World Health Organization thresholds for iodine deficiency and excess.

Results: Among younger women, relative to women in the lowest Hg quintile (<0.46 µg/L), women with Hg >2.06 µg/L (upper quintile) showed 2.37 (95% CI=1.28, 4.40) greater odds for elevated thyrotropin (>4.0 •IU/mL) coincident with thyroid antibody positivity. Among women with iodine deficiency, those with Hg >2.06 µg/L showed 4.97 (95% CI=1.23, 20.06) greater odds for thyroid antibody positivity coincident with thyrotropin >4.0 •IU/mL. Unlike thyrotropin or TPOAb, TgAB positivity alone was consistently associated with mercury, with an odds ratio above 2.00 for the upper quintile of mercury in overall sample and all sub-groupings of women.

Conclusions: We report a novel association between mercury and elevated thyrotropin coincident with positive thyroid autoantibodies, a strong predictor for hypothyroidism (positive predictive value=86%). Strongest associations were observed among women aged 20-59 and among women with iodine deficiency, and appeared to be driven by TgAB positivity. Further research into mercury, hypothyroidism and autoimmunity is warranted.