

Clinical Investigations

Thyroid Function Is Associated with Presence and Severity of Coronary Atherosclerosis

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Summary

Background: Overt hypothyroidism has been found to be associated with cardiovascular disease. Moreover, subclinical hypothyroidism is a strong indicator of risk for aortic atherosclerosis and myocardial infarction.

Hypothesis: We hypothesized that variation of thyroid function within the normal range may influence the presence and severity of coronary atherosclerosis.

Methods: We studied a total of 100 consecutive men and women (59 men, 41 women, age 63.7 ± 11.0 years) who underwent coronary angiography. Blood was tested for serum thyrotropin concentrations and for free tri-iodothyronine and free thyroxine concentrations. In addition to the assessment of thyroid function, conventional risk factors for coronary artery disease (CAD), clinical characteristics, serum lipid levels, fasting total homocysteine, and angiographic results of coronary artery assessment were obtained. Two experienced cardiologists blinded to clinical and laboratory data reviewed the cinefilms. The severity of CAD was scored as 0 for those with smooth normal epicardial coronary arteries, 0.5 for plaquing ($< 50\%$ diameter stenosis), and 1, 2, or 3 for those with single-, double-, or triple-vessel epicardial coronary artery stenosis of $> 50\%$, respectively.

Results: The severity of CAD was scored as 0, 0.5, 1, 2, and 3 in 14, 26, 25, 22, and 13 patients, respectively. Higher levels of serum-free thyroid hormone concentrations were associated with decreased severity of coronary atherosclerosis. Serum-free tri-iodothyronine was 2.99 ± 0.33 pg/ml in patients with a CAD severity score of 0 to 1 and 2.74 ± 0.49 pg/ml in patients with CAD severity scores of 2 and 3 ($p < 0.01$). Moreover, serum-free thyroxine concentrations showed a trend toward higher levels in patients with CAD severity score 0 to 1 compared with patients with CAD severity scores 2 and 3 (11.65 ± 1.87 pg/ml vs. 10.9 ± 2.3 pg/ml; $p = 0.09$). Higher levels of serum thyrotropin concentrations were associated with increased severity of coronary atherosclerosis (1.37 ± 1.02 mU/l vs. 1.98 ± 2.13 mU/l in patients with CAD severity score 0 to 1 versus CAD severity scores 2 and 3; $p = 0.049$). When grouped into three subsets according to their serum free tri-iodothyronine levels (< 2.79 , 2.8 to 3.09, and ± 3.1 pg/ml), the prevalence of CAD scores 2 and 3 was significantly higher in the subset of patients with low serum free tri-iodothyronine levels (48.5%) than in the subsets of patients with medium or high tri-iodothyronine concentrations (32.25 and 25%, respectively, p for trend < 0.05).

Conclusion: These data in patients referred for coronary angiography suggest that variation of thyroid function within the statistical normal range may influence the presence and severity of coronary atherosclerosis.

Key words: thyroid function, thyrotropin, coronary artery disease, hypothyroidism, hyperthyroidism

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