THYROID FUNCTION AFFECTS BLOOD PRESSURE HOMEOSTASIS IN EUTHYROID HUMANS
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Background: Overt and subclinical hypothyroidism are associated with increased systemic vascular resistance, hypertension and alterations in sodium homeostasis. We examined the relationship between thyroid function and blood pressure homeostasis in euthyroid human subjects.

Methods: 284 subjects (68% hypertensive) consumed high- (200 mmol) and low- (10 mmol) sodium diets for one week and their blood pressure responses were assessed as percent change in the mean arterial pressure (MAP). Thyroid function tests were performed in the morning of the high-salt study day. P-aminohippuric acid clearance was used to estimate effective renal plasma flow. MAP and renal vascular resistance (RVR) were calculated using standard formulas.

Results: Serum free thyroxine index (FTI) was lower (p < 0.0001) and thyrotropin (TSH) was higher (p = 0.046) in hypertensive compared to normotensive subjects independent of age, gender, race, body mass index (BMI) and insulin sensitivity. Serum FTI (β= -1.51, p < 0.0001), MAP and race were independent predictors of MAP salt-sensitivity. The relationship between FTI and salt-sensitivity adjusted for MAP and race was similar among normotensives (β = -1.42, p=0.008) and hypertensives (β= -1.66, p=0.0001). FTI correlated negatively with high-(r= -0.386, p=0.0001) and low-(r= -0.298, p=0.008) salt RVR, while TSH correlated positively with high-(r=0.270, p=0.016) and low-(r=0.343, p=0.012) salt RVR independent of age, gender, race and BMI.

Conclusion: We have found that serum FTI is lower and TSH is higher in hypertensive compared to normotensive euthyroid subjects and that FTI independently predicts blood pressure salt-sensitivity. These data show the influence of thyroid function on blood pressure homeostasis extends into euthyroid range and may reflect the action of thyroid hormone on peripheral vasculature.