

The relationship between resting energy expenditure and thyroid hormones in response to short-term weight loss in severe obesity.

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Background: Regulating thermogenesis is a major task of thyroid hormones (THs), and involves TH-responsive energetic processes at the central and peripheral level. In severe obesity, little is known on the relationship between THs and resting energy expenditure (REE) before and after weight loss.

Methods: We enrolled 100 euthyroid subjects with severe obesity who were equally distributed between genders. Each was examined before and after completion of a 4-wk inpatient multidisciplinary dieting program and subjected to measurement of thyroid function, REE, fat-free mass (FFM, kg) and percent fat mass (FM).

Results: Baseline REE was lower than predicted in 70 obese patients, and overall associated with BMI, FFM and FM but not thyroid-related parameters. By the study end, both BMI and REE decreased (5.5% and 4.1%, $p < 0.001$ vs. baseline) and their percent changes were significantly associated ($p < 0.05$), while no association related percent changes of REE and FFM or FM. Individually, REE decreased in 66 and increased in 34 patients irrespective of gender, BMI and body composition. Weight loss significantly impacted TSH (-6.3%), FT3 (-3.3%) and FT4 levels (3.9%; $p < 0.001$ for all). By the study end, a significant correlation became evident between REE and FT4 ($r = 0.42$, $p < 0.001$) as well as FT3 ($r = 0.24$, $p < 0.05$). In stepwise multivariable regression analysis, however, neither THs nor body composition entered the regression equation for REE response to weight loss.

Conclusions: In severe obesity, short-term weight loss discloses a positive relationship between REE and THs.

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