



Journal of Clinical Endocrinology & Metabolism, doi:10.1210/jc.2005-0920

## High circulating Thyrotropin levels in obese women are reduced after body weight loss induced by caloric restriction

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**Context:** Previous clinical studies concerning the impact of body weight loss on single plasma TSH concentration measurements or the TSH response to TRH in obese humans have shown variable results.

**Objective:** The objective of this study was to investigate the effect of weight loss induced by caloric restriction on diurnal TSH concentrations and secretion in obese humans.

**Design:** This was a clinical, prospective, crossover study.

**Setting:** The study was conducted at the Clinical Research Center of Leiden University Medical Center.

**Participants:** Eleven obese premenopausal women (body mass index,  $33.3 \pm 0.7$  kg/m<sup>2</sup>) were studied.

**Intervention:** The study intervention was weight loss (50% reduction overweight by caloric restriction).

**Main Outcome Measure(s):** Twenty-four-hour plasma TSH concentrations (10-min intervals) and the 24-h TSH secretion rate, calculated by a waveform-independent deconvolution technique (Pulse), were determined.

**Results:** The 24-h TSH secretion rate was significantly higher in obese women than in normal weight controls, and weight loss was accompanied by diminished TSH release (before weight loss,  $43.4 \pm 6.4$  mU/liter·24 h; after weight loss,  $34.4 \pm 5.9$  mU/liter·24 h;  $P = 0.02$ ). Circulating free T3 levels decreased after weight loss from  $4.3 \pm 0.19$  to  $3.8 \pm 0.14$  pmol/liter ( $P = 0.04$ ). Differences in 24-h TSH release correlated positively with the decline of circulating leptin ( $r^2 = 0.62$ ;  $P < 0.01$ ).

**Conclusions:** “Elevated TSH secretion in obese women is significantly reduced by diet-induced weight loss. Among various physiological cues, leptin may be involved in this phenomenon. The decreases in TSH and free T3 may blunt energy expenditure in response to long-term calorie restriction, thereby frustrating weight loss attempts of obese individuals.”

**This study demonstrates that there is a significant reduction in thyroid levels with dieting that is not detected by standard thyroid testing and the use of standard normal ranges.**