

Thyroid hormones in obese children

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Background

Nowadays, childhood obesity is one of the biggest health emergencies in the developed countries. Obesity leads to multiple metabolic disorders. Thyroid function has been often described as altered in obese children. There is controversy concerning whether the changes in the levels of thyroid hormones and thyroid-stimulating hormone (thyrotropin - TSH) in obesity are causes or consequences of weight status and whether TSH elevation is reversible after weight loss.

Thyroid hormones regulate basal metabolic rate and affect lipid metabolism thermogenesis. Thyroid functions are exerted by signal transduction from the thyroid hormone receptor, a member of the nuclear superfamily of hormone receptors. The mechanisms underlying the alteration of thyroid function in obesity have yet to be determined. Thyroid dysfunction may be an adaptation to the increased energy expenditure in obesity.

Objective and hypotheses

The aim of the current study was to examine the thyroid function and to assess the frequency of thyroid dysfunction in obese children and adolescents.

Method

A total of 119 obese Greek children were enrolled in this study. Blood samples were taken and anthropometric measurements were obtained, including height, weight, and waist circumference. The age of the children ranged from 6 to 14 years. Obesity was defined as a body weight exceeding 120% of the standard body weight, which was defined as the mean body weight for height and age based on national statistics for Greek school children in 2000. TSH, T4, anti-TPO, anti-TG levels were determined in 119 obese pediatric patients as well as in a control group of 120 normal weight children (same age group).

Results

- Median values of TSH and T4 levels in obese children were normal, but significantly higher compared to those of normal weight.
- Statistically significant correlation has been noticed between thyroid hormones concentrations and BMI z-scores of obese children. Elevated TSH (>5 μ IU/ml) with normal thyroxin level and negative antithyroid antibodies were detected in 5.5% of obese children but only in 0.7% of the control group, while subclinical hypothyroidism with positive antithyroid antibodies was reported in 7.2% of obese children contrary to 3.5% of control sample.
- Decrease of T4 levels was observed in 47.6% of obese children that had a significant weight loss ($p < 0.01$, Wilcoxon test).

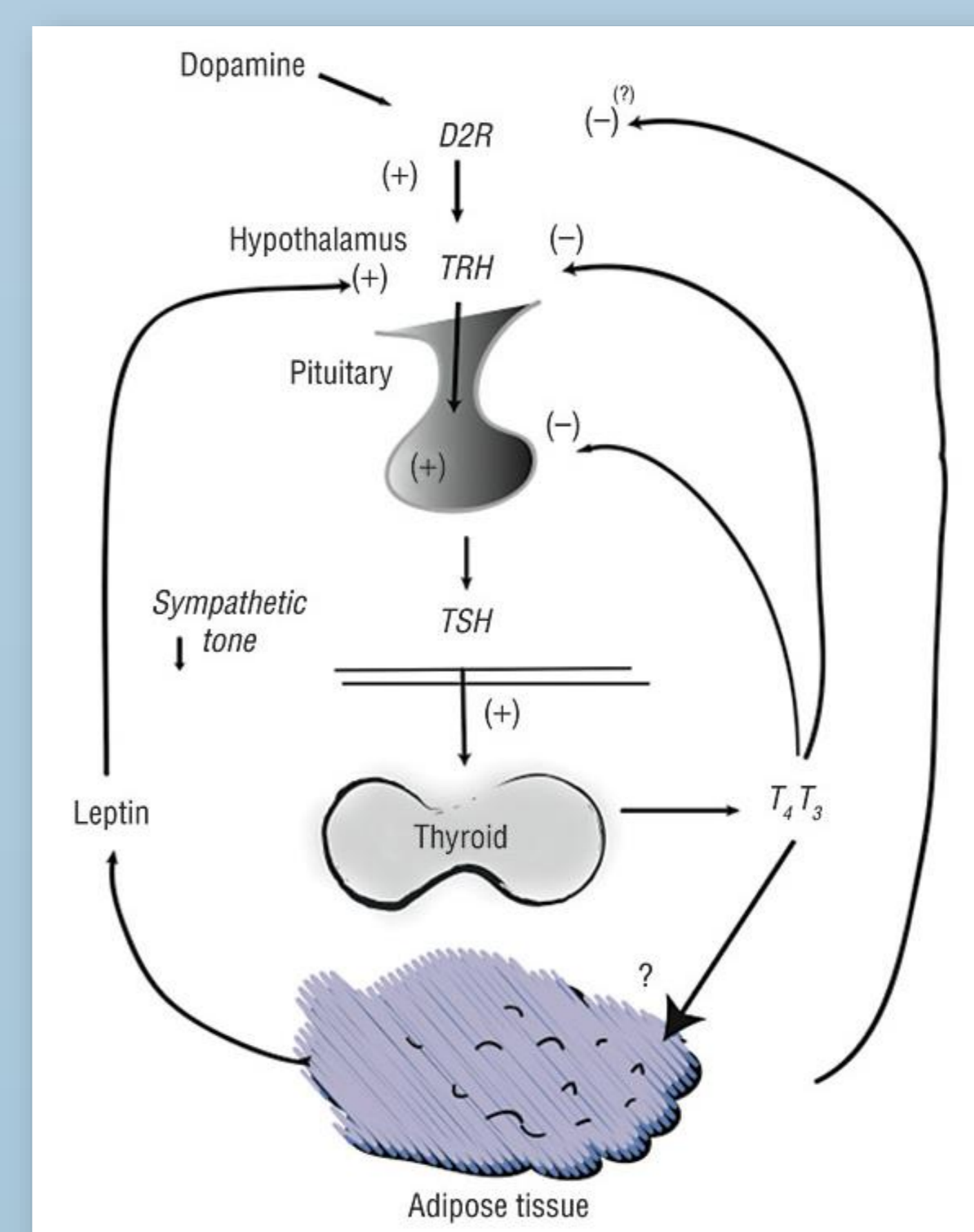
TSH, T4, anti-TPO, anti-TG levels were quantified using an electrochemiluminescence immunoassay.

Conclusion

Thyroid hormones are increased in obese children and weight reduction seems to result in a decrease of their levels. A high prevalence of autoimmune thyroiditis is observed among the population of obese children. Therefore, further evaluation of thyroid functions with larger sample sizes and long-term follow-up will be needed to address the influence of thyroid hormones on various parameters including anthropometric measurements, lipid profiles, insulin sensitivity, and blood pressure in obese children.

Conflict of interest

No potential conflicts of interest were disclosed.



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