

TSH/fT4 ratio as a marker of TSH resistance in Pseudohypoparathyroidism 1a and Obesity

Aurelia Alimi, Danièle Rodrigue, Agnès Linglart, Gianpaolo De Filippo

Service d'Endocrinologie et Diabétologie Pédiatrique, Hôpitaux Universitaires Paris Sud
Assistance Publique – Hôpitaux de Paris, CHU de Bicêtre, France



Background

G α is imprinted in human thyroid glands and this appears to be important in the development of moderate TSH resistance in Pseudohypoparathyroidism (PHP)1a and less severe TSH resistance in some, but not all, other forms of PHP. Obesity is a clinical condition in which subclinical alterations of thyroid function have been reported, although the relationship between thyroid status and obesity remains unclear. It is uncertain if this biochemical abnormality may be a secondary phenomenon of obesity or a real hypothyroid state.

Objective and hypothesis

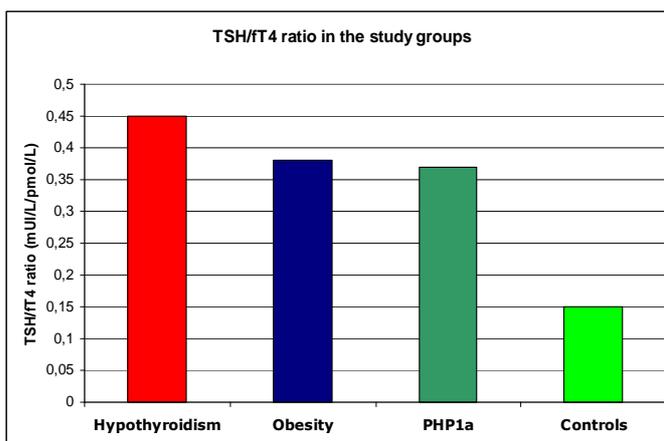
To investigate the correlation between TSH and circulating levels of fT4 (i.e. TSH/fT4 ratio; mUI/L/pmol/L) in patients with mild hypothyroidism affected with PHP1a, obesity and hypothyroidism secondary to Hashimoto's thyroiditis. Our hypothesis are: 1) patients with PHP1a and obesity present a ratio suggesting a resistance phenomenon 2) the ratio could be similar in two study groups and significantly different from hypothyroid patients.

Methods

We studied 23 patients with mild hypothyroidism (i.e. TSH value ≥ 2.5 and $< 10 \mu\text{IU/ml}$) affected with PHP1A (n=7: mean age 7.3 ± 5.6 years), obesity (i.e. BMI z-score > 2 , n=8: mean age 10.4 ± 3.2 years) and hypothyroidism secondary to Hashimoto's thyroiditis (n=8: mean age 11.3 ± 3.6 years). Subjects were matched for TSH levels (mean TSH 5.4 ± 2.4 , 5.5 ± 1.5 and $4.9 \pm 0.6 \mu\text{IU/ml}$, respectively: $p=0.533$ ANOVA). Patients with PHP1A or obesity were negative for thyroid autoimmunity. 10 healthy age and fT4 matched subjects were included as controls.

Results

The TSH/fT4 ratio was higher in hypothyroid patients (0.45 ± 0.16) than in PHP1a and obese subjects (0.37 ± 0.18 and 0.38 ± 0.13) showing a trend without reaching statistical significance. PHP1a and obese patients show a very similar hormonal phenotype. TSH/fT4 ratio in control subjects was 0.15 ± 0.06 ($p < 0.001$ versus patients with mild hypothyroidism).



Conclusions

The observed trend could suggest that a ratio less than 0.40 in presence of TSH levels higher than 2.5 could indicate a resistance phenotype requiring further explorations. The strong similarity between PHP and obese thyroid hormonal phenotype could be supplementary evidence that obesity is associated with TSH resistance rather than a real hypothyroid state.

Contacts: gianpaolo.defilippo@bct.aphp.fr

Disclosure statement

none of the authors have conflict of interest to declare.

