Serum fibroblast growth factor 21 (FGF-21) levels of children and adolescents with Hashimoto’s thyroiditis, before and after L-thyroxin medication

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Background

• Fibroblast growth factor 21 (FGF-21) is a complex molecule involved in energy, lipid and glucose metabolism, sharing biochemical pathways and sites of action with thyroid hormones.
• FGF-21 is synthesized and acts primarily on the liver, but weaker expression has also been described in muscle, pancreas and adipose tissue.
• FGF-21 acts through both endocrine and paracrine mechanisms, regulating different metabolic pathways like fatty acid oxidation, glucose uptake and thermogenesis.
• Recent animal and human studies have highlighted a close bidirectional relationship between FGF-21 and THs, which is partially elucidated.
• The aim of the present study was to investigate possible associations among FGF-21 levels, resting metabolic rate (RMR), lipidemic profile and L-thyroxin replacement therapy treatment in children and adolescents with Hashimoto’s thyroiditis and hypothyroidism.

Methods

• Sixty children and adolescents (age range 5-18 year old), with newly diagnosed Hashimoto’s thyroiditis (30 in hypothyroidism, 30 in euthyroidism) and 30 age and gender matched healthy participants (control group) were enrolled.
• Biochemical parameters, Resting Metabolism Rate (RMR) and serum FGF-21 levels were assessed in all participants.
• Participants with Hashimoto’s thyroiditis and hypothyroidism were thereafter administered L-thyroxin replacement therapy. Six months after initiation of L-thyroxin medication, serum FGF-21 levels were re-evaluated.

Results

• At baseline, serum FGF-21 levels were measured lower in the hypothyroidism group compared to the control group, but this difference was not statistically significant [182.71pg/mL (169.3-234.6) vs 217.36pg/mL (193.6 -235.2), p=0.717].
• Despite the increase in serum FGF-21 levels after 6 months of L-thyroxin treatment, this augmentation did not reach significance [198.43pg/mL (183.8-248.4) vs 182.71pg/mL(169.3-234.6) p=0.734].
• Free thyroxin levels correlated positively to FGF-21 levels in both the total study population (r=0.399, p<0.01) and in the group with hypothyroidism at baseline-before treatment (r=0.385, p<0.05).
• Participants with hypothyroidism and euthyroidism presented elevated triglyceride levels (p<0.05).
• L-thyroxin treatment had no impact on RMR, lipid concentrations or glycemic parameters.
• An increase in fat mass and free fat mass was reported in the hypothyroidism group after L-thyroxin treatment with L-thyroxin administration, independently of serum FGF-21 levels.

Conclusion

• At baseline, serum FGF-21 levels were measured lower in the hypothyroidism group compared to the control group, but this difference was not statistically significant [182.71pg/mL (169.3-234.6) vs 217.36pg/mL (193.6 -235.2), p=0.717].
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References

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