

Timing of levothyroxine administration in the treatment of primary hypothyroidism

A thesis

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Abstract

Background

There is a controversy on the appropriate time for L-thyroxine intake during the day. Proper timing of L-thyroxine administration could have a beneficial effect in early obtaining euthyroid state. This approach to treatment of hypothyroidism is based on the fact that thyrotropin is one of the biological substances that subjected to circadian rhythm.

Objectives

The study was designed to investigate the best time for L-thyroxine administration to achieve earlier normalization of thyrotropin (TSH) and free thyroxine (FT4) in patients with primary hypothyroidism.

Methods

One hundred and eight patients with primary hypothyroidism were enrolled in the study from Al-Faiha Diabetes Endocrine and Metabolism Center in Basrah (FDEMC) for the Period from November 2012 to July 2013. The patients were divided into two groups; morning treated group, consisted of 41 patients and treated by L-thyroxine one hour before breakfast. The second was evening treated group for which L-thyroxine was given two hours after the last meal. The starting dose was 1.6 mcg/kg daily given for all those below age of 50 years those above that age starting half dose. FT4, TSH, fasting plasma glucose and lipid profile were measured before treatment with L-thyroxine and repeated after three months. FT4 was measured monthly during the three months study period. Body mass index (BMI) and blood pressure were measured at baseline and after 3 months.

Results

Eighty two patients had completed the study, 41 patients in the morning and 41 patients in the evening group. The two groups showed reduction in TSH but the reduction in TSH of the evening group was slightly and insignificantly higher than the morning group (The mean difference of reduction from baseline was 11.3 ± 22.5 mIU/ml for morning group and 13.6 ± 22.2 mIU/ml for evening group, $P=0.63$, $df = 80$, 95% CI: -12.17, 7.5).

The mean increase in FT4 after three months treatment compared to baseline for morning and that for the evening treatment (7.6 ± 6 vs 5.7 ± 4.9) pmol/l revealed no significant differences between the two, $P=0.12$, $df = 80$, 95% CI: -0.5, 4.3.

A relationship was made between changes in TSH and FT4, which showed a weak but significant correlation between the reduction in TSH and the increase in FT4 ($r = -0.33$, $p = 0.034$) for the evening group. While for the morning group, poor correlation was found between TSH and FT4 ($r = -0.21$, $p=0.1$)

The secondary parameters: serum lipid profile, fasting plasma glucose, BMI and blood pressure were almost the same for the two treatments and statistical differences were not obtained a part from a small reduction in the BMI for the evening treated group in comparison to the morning treated group.

Conclusion

We concluded that there were no differences between the morning and evening treatment with L-thyroxine in regards to earlier normalization of TSH and FT4.