1: J Endocrinol Invest. 2002 Feb;25(2):106-9.

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Levothyroxine therapy and serum free thyroxine and free triiodothyronine concentrations.

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Although the normal thyroid gland secretes both levothyroxine (L-T4) and levotriiodothyronine (L-T3), normalization of serum TSH with L-T4-replacement therapy alone in hypothyroidism is generally believed to result in a normal serum L-T3 and to reflect a euthyroid state. However several recent studies suggest that this may not be the case. Accordingly, the relationship between serum free L-T4 and free L-T3 was examined in 20 normal individuals (group A) and in 53 patients with chronic autoimmune thyroiditis, 18 with normal TSH on no L-T4-replacement (group B), and 35 with normal TSH on L-T4-replacement therapy for hypothyroidism (group C). Data were analyzed by applying a one-way analysis of variance with correction for multiple comparisons. Serum TSH values were very similar among the 3 groups. In groups A and B, mean serum free T4 and free T3 were very similar. In group C, the mean free T4 (16+/-2 pmol/l) was significantly higher than the values in groups A (14+/-1) and B (14+/-2) ($p<0.001$) and the mean free T3 lower (4.0+/-0.5 pmol/l vs 4.2+/-0.5, NS and 4.4+/-0.5, $p<0.02$). Consequently, the mean molar ratio of free T4 to free T3 was significantly higher in group C than the ratios in groups A and B ($p<0.0001$), despite very similar TSH values. These findings indicate that in hypothyroid patients L-T4-replacement, that is sufficient to maintain a normal serum TSH, is accompanied by a serum free T4 that is higher than that in untreated euthyroid patients or normal individuals and may not result in an appropriately normal serum free T3 concentration.

PMID: 11929079 [PubMed - indexed for MEDLINE]