



HYPOTHYROIDISM

Patients with hypothyroidism adequately treated with levothyroxine have higher levels of cholesterol compared to healthy controls.

BACKGROUND

Hypothyroidism is common, affecting up to 5% of people in the United States, with mild hypothyroidism affecting up to 20% of selected populations. Many of the symptoms of hypothyroidism are nonspecific and hard to quantify. The thyroid gland is controlled by thyroid stimulating hormone (TSH) secreted by the pituitary gland. TSH levels increase when the thyroid hormone levels fall in the patient who develops hypothyroidism. Treatment of hypothyroidism involves replacing the thyroid hormones, usually in the form of levothyroxine (L-T₄).

Some of the objective signs in hypothyroidism include increases in the level of cholesterol, both total and LDL cholesterol. Decreases in brain function and energy expenditure are also seen. These changes all should be reverse during treatment with L-T₄, with a goal of therapy decreasing TSH levels back to the normal range. Once the TSH is normal, cholesterol and creatine kinase levels, brain function and energy expenditure should also return to normal. The objective of this study was to determine if normalization of TSH in patients with hypothyroidism treated with L-T₄ led to normalization of these thyroid hormone therapy markers. In this study, previously published data on that topic was systematically reviewed, combined and analyzed together.

THE FULL ARTICLE TITLE

McAninch EA et al. Systemic Thyroid Hormone Status During Levothyroxine Therapy In Hypothyroidism: A Systematic Review and Meta-Analysis. *J Clin Endocrinol Metab.* 2018 Aug 15. doi: 10.1210/jc.2018-01361

SUMMARY OF THE STUDY

A systemic literature review identified 99 studies from

1970 to 2017 eligible for analysis. The analysis of 23 studies showed that hypothyroid patients treated with L-T₄ to achieve normal serum TSH levels had significantly higher LDL and total cholesterol levels than healthy individuals with normal thyroid function. Similarly, analysis of 41 studies that lacked data from individuals with normal thyroid function reported that L-T₄-treated hypothyroid patients had an average LDL level of 138.2 mg/dl and cholesterol level of 209.6 mg/dl, which are higher than recommended. Moreover, many patients with hypothyroidism were treated with cholesterol lowering medications. Kidney function was assessed in L-T₄-treated patients and individuals with normal thyroid function in six studies; the results were consistent with restoration of normal renal function in L-T₄-treated patients. L-T₄-treated patients had lower energy expenditure than healthy controls in one study. Finally, brain test results also normalized following L-T₄ therapy.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that LDL and total cholesterol levels were higher in patients with hypothyroidism who achieved a normal TSH following L-T₄ therapy than in individuals with normal thyroid function. This suggests that L-T₄ alone is not sufficient to normalize cholesterol levels. The role of alternative therapies, such as combination therapy by adding L-T₃ to L-T₄, should be studied to determine if they improve the response of cholesterol levels over that seen with L-T₄ alone. Finally, studies need to be done to determine if hypothyroid patients on L-T₄ are at any increased risk of cardiac problems based on the increase in cholesterol levels.

—Valentina D.Tarasova, MD

ATA WEB BROCHURE LINKS:

Hypothyroidism (Underactive): <https://www.thyroid.org/hypothyroidism/>





HYPOTHYROIDISM, continued

ABBREVIATION AND DEFINITIONS:

Thyroxine (T₄): the major hormone produced by the thyroid gland. T₄ gets converted to the active hormone T₃ in various tissues in the body.

Triiodothyronine (T₃): the active thyroid hormone, usually produced from thyroxine, available in pill form as Cytomel™.

Hypothyroidism: a condition where the thyroid gland is underactive and doesn't produce enough thyroid hormone. Treatment requires taking thyroid hormone pills.

TSH: thyroid stimulating hormone — produced by the pituitary gland that regulates thyroid function; also the best screening test to determine if the thyroid is functioning normally.

Levothyroxine (LT₄): the major hormone produced by the thyroid gland and available in pill form as Synthroid™, Levoxyl™, Tyrosint™ and generic preparations.

Thyroid hormone therapy: patients with hypothyroidism are most often treated with Levothyroxine in order to return their thyroid hormone levels to normal. Replacement therapy means the goal is a TSH in the normal range and is the usual therapy. Suppressive therapy means that the goal is a TSH below the normal range and is used in thyroid cancer patients to prevent growth of any remaining cancer cells.

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