



## THYROID CANCER

# Initial treatment of thyroid cancer with levothyroxine results in metabolic changes among women

### BACKGROUND

Hypothyroidism causes changes in metabolism, resulting in a general slowing down of energy expenditure and metabolic rate. This means that hypothyroid patients burn up less calories than individuals with normal thyroid function. This is thought to be a major reason why hypothyroid patients tend to gain weight. There is controversial information regarding the effects of thyroid hormone on metabolism in hypothyroid patients and whether levothyroxine treatment returns metabolism to normal. This study was done to compare the metabolic rate in patients when they had normal thyroid function to when they were hypothyroid and on levothyroxine. By using patients with thyroid cancer who underwent thyroidectomy, radioactive iodine ablation and who were on TSH-suppressive doses of levothyroxine, the study was able to evaluate potential effects of levothyroxine on these changes in metabolism in a controlled manner as well as possible adverse side effects of levothyroxine-suppression therapy.

### THE FULL ARTICLE TITLE

Izkhakov E et al 2019 Body composition, resting energy expenditure and metabolic changes in women diagnosed with differentiated thyroid carcinoma. *Thyroid*. Epub May 15. PMID: 31088334.

### SUMMARY OF THE STUDY

The authors studied 15 women, aged 18-62 with thyroid cancer who had normal thyroid function when they were diagnosed and were subsequently treated with total thyroidectomy, radioactive iodine ablation and levothyroxine-induced TSH suppressive therapy. Women were studied before surgery, when hypothyroid after surgery, and at 3 time points while on levothyroxine therapy, the last at >12

mo from starting levothyroxine. In addition to thyroid hormone levels, vital signs, glucose, cholesterol levels and body composition determined by dual energy X-ray absorptiometry (DEXA), metabolic testing was done using an open-circuit indirect calorimeter testing to determine resting energy expenditure (REE) and other measures of metabolism (respiratory quotient (RQ) calculated as  $RQ = CO_2/O_2$ ).

When compared to their values at baseline, TSH levels were uniformly lower – either just at the lower limit of normal or suppressed,  $FT_4$  levels were higher – although most within the normal range,  $T_3$  levels were lower, and, as expected  $T_3/FT_4$  ratios were lower. Body mass index (BMI) and lean body mass, glucose and cholesterol were unchanged. However, heart rate and blood pressure were higher. REE was increased, but despite this, weight was stable. On the other hand the respiratory quotient (RQ) was lower and correlated over time with lower  $T_3/FT_4$  ratios.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Levothyroxine-induced TSH suppressive therapy in patients with thyroid cancer results in an increase in energy expenditure but also increases in heart rate and blood pressure, which may have adverse effects on the heart. This shows that levothyroxine can improve metabolic rate in hypothyroid patients. This also supports the updated recommendations from the American Thyroid Association limiting the use of levothyroxine-suppression to patients with high risk cancers or those with low to intermediate risk cancers who have not had an excellent response to therapy.

— Marjorie Safran, MD

### ATA THYROID BROCHURE LINKS

Thyroid Cancer (Papillary and Follicular): <https://www.thyroid.org/thyroid-cancer/>

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

Thyroid Hormone Treatment: <https://www.thyroid.org/thyroid-hormone-treatment/>





## THYROID CANCER, continued

### ABBREVIATIONS & DEFINITIONS

**Levothyroxine (T4):** the major hormone produced by the thyroid gland and available in pill form as Synthroid™, Levoxyl™, Tyrosint™ and generic preparations.

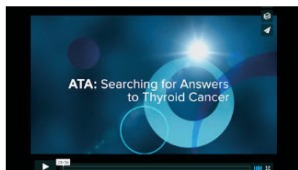
**Thyroid hormone therapy:** patients with hypothyroidism are most often treated with Levothyroxine in order to return their thyroid hormone levels to normal. Replacement therapy means the goal is a TSH in the normal range and is the usual therapy. Suppressive therapy means that the goal is a TSH below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

**Body Composition:** The human body is composed of fat mass, muscle mass (lean body mass) and bone mass. Total body water is included in the measurements of muscle mass.

**Lipids:** the general term used to describe fat molecules in the blood. Examples of blood lipids include cholesterol, HDL (“good”) cholesterol, LDL (“bad”) cholesterol and triglycerides.

**Body-mass index (BMI):** a standardized measure of obesity calculated by dividing the weight in kilograms by the square of the height. A normal BMI is 18.5-24.9, overweight is 25-30 and obese is >30.

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