



## HYPOTHYROIDISM

# Is the replacement dose of levothyroxine affected by the presence of the thyroid?

### BACKGROUND

Levothyroxine is the preferred medication used to treat people who are hypothyroid since it is the synthetic form of the predominant hormone that the thyroid makes. The dose needed to return the thyroid hormone levels to normal depends on many factors such as age, body weight, the timing of administration and whether the patient has other medical issues. It also depends on the cause of the hypothyroidism. For example, a patient with hypothyroidism due to Hashimoto's thyroiditis and who has a thyroid gland often will require a lower dose than a patient who has no thyroid at all, such as after treatment of thyroid cancer.

The goal of treating a patient with levothyroxine is to reach normal levels of thyroid hormone quickly, avoiding doses that are either excessive or insufficient. Some patients require many changes of their dose before achieving this goal. This is concerning because there are circumstances in which achieving a specific blood level is part of the treatment of a condition such as thyroid cancer, in which it is desirable for many patients to have a blood level higher than normal for some time. This study aimed at determining the contribution of the thyroid to the levothyroxine dose and the degree of increase the dose after having a thyroidectomy.

### THE FULL ARTICLE TITLE

Del Duca SC et al Individually-tailored thyroxine requirement in the same patients before and after thyroidectomy: a longitudinal study. *Eur J Endocrinol*, June 19, 2015 [Epub ahead of print].

### SUMMARY OF THE STUDY

This study was done using patients who had a multinodular goiter and were followed in a clinic. As part of the treatment of the goiter to try to shrink the gland, they were given thyroid hormone in a dose slightly higher than normal and those levels were consistent for one year. They all took the same brand of levothyroxine and at the same time of the day. Eventually, a group of 158 patients had surgery due to either a diagnosis of thyroid

cancer, or symptoms of discomfort in the neck due to the goiter. Of the 83 patients that had thyroid cancer, 23 were chosen for this study, because they had a cancer that was considered early stage and low risk, and as such, they needed to maintain slightly higher than normal blood levels of thyroid hormone for at least one year after the surgery. After their treatment was completed, the patients were given the same dose they were on before the surgery and their labs were checked regularly. The doses were adjusted as needed to achieve the same blood level as they had before the surgery.

Despite the fact that patient's weight and dose was identical before and after surgery, only 2 out of the 23 patients reached a blood level that was similar to their level before surgery without requiring a dose increase. In the remaining 21 patients, the dose needed to be substantially increased in order to be at goal. After 1 year, the patient's average dose was 30% higher than before the surgery. Despite the increase in dose to get the TSH level to the intended level, the levels of the T<sub>3</sub> and T<sub>4</sub> hormones did not change significantly.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study suggests that the thyroid itself may contribute up to 30% of a patient's levothyroxine requirements. This study also helps to clarify the change in dose needed when a patient with hypothyroidism undergoes a thyroidectomy. This study is important to patients because it adds to the information available regarding adjusting thyroid hormone levels in patients with hypothyroidism. More studies are needed to help us understand why these changes happen so that treatment can be potentially further improved.

— Jessie Block-Galarza, MD

### ATA THYROID BROCHURE LINKS

Hypothyroidism: <http://www.thyroid.org/hypothyroidism>

Thyroid cancer: <http://www.thyroid.org/cancer-of-the-thyroid/>

**HYPOTHYROIDISM**, continued**ABBREVIATIONS & DEFINITIONS**

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

**Hashimotos thyroiditis:** the most common cause of hypothyroidism in the United States. It is caused by antibodies that attack the thyroid and destroy it.

**Goiter:** a thyroid gland that is enlarged for any reason is called a goiter. A goiter can be seen when the thyroid is overactive, underactive or functioning normally. If there are nodules in the goiter it is called a nodular goiter; if there is more than one nodule it is called a multinodular goiter.

**Thyroidectomy:** surgery to remove the entire thyroid gland. When the entire thyroid is removed it is termed a total thyroidectomy. When less is removed, such as in removal of a lobe, it is termed a partial thyroidectomy.

**Levothyroxine (T<sub>4</sub>):** the major hormone produced by the thyroid gland and available in pill form as Synthroid™, Levoxyl™, Tyrosint™ and generic preparations.

**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.

**Thyroxine (T<sub>4</sub>):** the major hormone produced by the thyroid gland. T<sub>4</sub> gets converted to the active hormone T<sub>3</sub> in various tissues in the body.

**Triiodothyronine (T<sub>3</sub>):** the active thyroid hormone, usually produced from thyroxine.