



## THYROID CANCER

# Recombinant human TSH is as effective as thyroid hormone withdrawal in treating thyroid cancer patients with radioactive iodine

### WHAT IS THE STUDY ABOUT?

After the initial surgery for thyroid cancer, many patients are treated with radioactive iodine. Patients are prepared for radioactive iodine treatment by increasing TSH levels, either by stopping thyroid hormone therapy for a period of time and becoming hypothyroid (thyroid hormone withdrawal) or by administering TSH in the form of recombinant human TSH (rhTSH, Thyrogen), which has been available since 1997. The main advantage of rhTSH is the avoidance of the symptoms of hypothyroidism while allowing effective treatment of any residual thyroid cancer. Now that there is more than a decade of experience, it is clear that rhTSH preparation for radioactive iodine is effective in low risk patients. What is not clear is whether rhTSH is as effective as thyroid hormone withdrawal in treating thyroid cancer that has spread outside of the neck (metastatic), something that is often not discovered until after the treatment. This study compares the outcomes in patients with metastatic thyroid cancer who were treated with radioactive iodine after rhTSH as compared to after thyroid hormone withdrawal.

### THE FULL ARTICLE TITLE:

Tuttle RM et al. Radioactive iodine administered for thyroid remnant ablation following recombinant human thyroid stimulating hormone preparation also has an important adjuvant therapy function. *Thyroid* 2010;20:257-63.

### WHAT WAS THE AIM OF THE STUDY?

The aim of this study was to determine if rhTSH was as effective as thyroid hormone withdrawal in the first treatment with radioactive iodine after surgery for thyroid cancer in patients subsequently found to have spread of the cancer outside of the neck.

### WHO WAS STUDIED?

The study group included 84 thyroid cancer patients who were found to have metastatic cancer after their first radioactive iodine treatment.

### HOW WAS THE STUDY DONE?

A total of 64 patients were prepared for radioactive iodine therapy by rhTSH and 20 patients were prepared by thyroid hormone withdrawal. All patients had post-radioactive iodine treatment scans and, if there was evidence of spread outside the neck, also had CT scans. Most patients had diagnostic rhTSH scans 18 months after the initial radioactive iodine treatment.

### WHAT WERE THE RESULTS OF THE STUDY?

In most patients (94% rhTSH, 80% thyroid hormone withdrawal), the spread of the thyroid cancer remained within the neck. The remaining patients (4 from each group) also had spread of the cancer to the lungs. A total of 28 of 64 (44%) of the rhTSH group and 6 of 20 (30%) of the thyroid hormone withdrawal group had their metastatic thyroid cancer successfully treated after the initial radioactive iodine treatment. Overall, there were no differences in outcome after treatment with either rhTSH or thyroid hormone withdrawal.

### HOW DOES THIS COMPARE WITH OTHER STUDIES?

This study is similar to a multi-center international study comparing rhTSH and thyroid hormone withdrawal published in 2009. That study followed approximately fifty patients.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This is further assurance that rhTSH is an effective drug for use in treating thyroid cancer. Although it is expensive, its use spares patients from the significant symptoms of hypothyroidism that usually occur with withdrawal. In elderly patients and those with other co-existing conditions such as heart disease, withdrawal and resumption of thyroid hormone therapy is cumbersome and may itself be risky.

— Henry Fein, MD

### ATA THYROID BROCHURE LINKS

Thyroid cancer: [http://thyroid.org/patients/patient\\_brochures/cancer\\_of\\_thyroid.html](http://thyroid.org/patients/patient_brochures/cancer_of_thyroid.html)

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## THYROID CANCER, continued

### ABBREVIATIONS & DEFINITIONS

**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.

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

**Radioactive iodine (RAI)** — this plays a valuable role in diagnosing and treating thyroid problems since it is taken up only by the thyroid gland. I-131 is the destructive form used to destroy thyroid tissue in the treatment of thyroid cancer and with an overactive thyroid. I-123 is the non-destructive form that does not damage the thyroid and is used in scans to take pictures of the thyroid (Thyroid Scan) or to take pictures of the whole body to look for thyroid cancer (Whole Body Scan).

**Diagnostic Whole Body Scans** — these radioactive iodine scans are performed under TSH stimulation,

either after thyroid hormone withdrawal or after injections of recombinant human TSH (Thyrogen), and usually include measuring serum thyroglobulin levels.

**Post- Radioactive iodine Whole Body Scan (post-RAI WBS)** — the scan done after radioactive iodine treatment that identifies what was treated and if there is any evidence of metastatic thyroid cancer.

**Recombinant human TSH (rhTSH)** — human TSH that is produced in the laboratory and used to produce high levels of TSH in patients after an intramuscular injection. This is mainly used in thyroid cancer patients before treating with radioactive iodine or performing a whole body scan. The brand name for rhTSH is Thyrogen™.

**Thyroid Hormone Withdrawal (THW)** — this is used to produce high levels of TSH in patients by stopping thyroid hormone pills and causing short-term hypothyroidism. This is mainly used in thyroid cancer patients before treating with radioactive iodine or performing a whole body scan.