



THYROID CANCER

Preparation of thyroid remnant ablation using recombinant human TSH and 30 mCi of I-131 is as effective as thyroid hormone withdrawal

WHAT IS THE STUDY ABOUT?

After surgery, many patients with thyroid cancer are treated with radioactive iodine. The main reason to treat with radioactive iodine is to destroy any normal thyroid tissue remaining in the thyroid bed (thyroid remnant) as well as thyroid cancer remaining after surgery. After the radioactive iodine treatment, a whole body scan (post-RAI WBS) is done to identify any thyroid cancer that has spread outside the thyroid bed (i.e. become metastatic). In order for radioactive iodine to be effective, the patient's TSH levels need to be increased to stimulate the thyroid cells to take up the radioactive iodine and be destroyed. There are two ways to increase TSH: 1) withdraw the patient from thyroid hormone (THW), thus making the patient hypothyroid for a short period of time or 2) use recombinant human TSH (rhTSH) to allow patients to stay on their thyroid hormone and avoid the short term hypothyroidism. In general, there has been a trend toward using lower amounts of radioactive iodine, with previous studies suggesting that a 50 mCi dose is as effective as a 100+ mCi dose. This study goes further in examining an even lower dose (30 mCi) in low risk patients. This dose is aimed at destroying any remaining normal thyroid tissue (Thyroid Remnant Ablation) rather than ensuring that all remaining thyroid cancer cells are destroyed. The aims of this study were: 1) to determine if treatment with 30 mCi I-131 after preparation with rhTSH was comparable 30 mCi I-131 after THW in thyroid remnant ablation and 2) to compare the quality of life of patients with thyroid cancer who were prepared with rhTSH versus those prepared with THW.

THE FULL ARTICLE TITLE:

Lee et al. Quality of life and effectiveness comparisons of thyroxine withdrawal, triiodothyronine withdrawal, and recombinant thyroid-stimulating hormone administration for low-dose radioiodine remnant ablation of differentiated thyroid carcinoma. *Thyroid* 2010;20:173-9.

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ablation and 2) to compare the quality of life of patients with thyroid cancer who were prepared with rhTSH versus those prepared with THW.

WHO WAS STUDIED?

The study group included 281 patients who were treated for thyroid cancer from February 2006 through March 2007. After surgery, all patients were started on 2 µg/kg of levothyroxine (L-T₄).

HOW WAS THE STUDY DONE?

At least 30 days after surgery, patients were randomly assigned to one of three groups:

- 1) T4 THW - L-T₄ was discontinued for 4 weeks prior to radioactive iodine
- 2) T3 THW - L-T₄ was discontinued for 4 weeks followed by 2 weeks on and 2 weeks off L-T₃ prior to radioactive iodine
- 3) rhTSH – patients remained on L-T₄ and treated with rhTSH prior to radioactive iodine.

All patients were on a 2-week low-iodine diet prior to the radioactive iodine therapy. The patients also completed a seven-item written quality-of-life questionnaire after the radioactive iodine therapy. The success of the radioactive iodine therapy in thyroid remnant ablation was assessed at 12 months with a whole-body I-131 scan, serum thyroglobulin measurement and neck ultrasonography.

WHAT WERE THE RESULTS OF THE STUDY?

Effective thyroid remnant ablation was achieved in >91% of patients in all three groups, as judged by a negative whole-body I-131 scan and low/undetectable thyroglobulin levels one year after the radioactive iodine therapy. There was no difference between the T4-THW, T3-THW or rhTSH groups. In all 3 groups, patients with lymph node metastases were identified with the 30 mCi dose. There was a highly significant difference in quality-of-life status between the two THW groups (T4-THW and T3-THW) and the rhTSH group.

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HOW DOES THIS COMPARE WITH OTHER STUDIES?

This is one of the few prospective, randomized studies that analyze the efficacy of 30 mCi of I-131 for thyroid remnant ablation. Other studies have shown that THW and rhTSH are equally effective in thyroid remnant ablation using higher I-131 doses (50 mCi) and the [article by Tuttle et al in this issue](#) shows that THW and rhTSH are equally effective in treating metastatic thyroid cancer.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that rhTSH can be used with low dose I-131 for effective thyroid remnant ablation after surgery

in patients that have low-risk thyroid cancer. The use of lower doses of I-131 decreases total-body irradiation and decreases damage to nonthyroidal tissues.

— Alan Farwell, MD

ATA THYROID BROCHURE LINKS

Thyroid cancer: http://thyroid.org/patients/patient_brochures/cancer_of_thyroid.html

ABBREVIATIONS & DEFINITIONS

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).

Thyroid Remnant Ablation — destruction of the small amount of thyroid tissue that remains after surgery (thyroidectomy) with the use of radioactive iodine.

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.

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™.

Thyroglobulin — a protein made only by thyroid cells, both normal and cancerous. When all normal thyroid tissue is destroyed after radioactive iodine therapy in patients with thyroid cancer, thyroglobulin can be used as a thyroid cancer marker.

Thyroid Ultrasound — a common imaging test used to evaluate the structure of the thyroid gland. Ultrasound uses soundwaves to create a picture of the structure of the thyroid gland and accurately identify and characterize nodules within the thyroid. Ultrasound is also frequently used to guide the needle into a nodule during a thyroid nodule biopsy.