



## GOITER

### WHAT IS THE STUDY ABOUT?

Multinodular goiters are very common as we get older. They also are common in areas that have low amounts of iodine in their diet, such as parts of Europe and Asia. In the United States, anywhere from one-third to one-half of people over the age of 50 will have one or more nodules in their thyroid. While multinodular goiters can be over active or the nodules could indicate that a cancer is present, most function normally and do not include a cancer. Occasionally, multinodular goiters can enlarge and put pressure on structures in the neck, causing choking and difficulty swallowing. When this occurs, the usual treatment is surgery. Recently, some studies have suggested that large multinodular goiters can shrink if treated with radioactive iodine (RAI). Further, some studies have shown that the RAI can be more effective if the thyroid is turned on first by treatment with recombinant human TSH (rhTSH). At present, rhTSH is mainly used for treating patients with thyroid cancer and has not yet been approved by the Food and Drug Administration for this reason. The aim of this study was to determine how long before the RAI treatment that rhTSH should be given to get the best effect.

### THE FULL ARTICLE TITLE:

Fast S, Nielsen VE, Grupe P, Bonnema SJ, Hegedus L. Optimizing <sup>131</sup>I uptake after rhTSH Stimulation in patients with nontoxic multinodular goiter: evidence from a prospective, randomized, double-blind study. *J Nucl Med* 2009;50:732-7.

### WHAT WAS THE AIM OF THE STUDY?

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### WHO WAS STUDIED?

The study group included 90 patients referred for RAI treatment of large multinodular goiters at the Nuclear Department of the Odense University Hospital in Odense, Denmark. There were 78 women (87%) and 12 men (13%) with an age range from 22 to 83 years. A multinodular goiter was defined as a thyroid gland with two or more nodules larger than 1 cm determined by ultrasound. Patients routinely had a clinical evaluation, thyroid function tests and a neck ultrasound examination. Fine-needle aspiration biopsy was performed on large nodules to determine if a cancer was present.

### HOW WAS THE STUDY DONE?

The patients were given either an injection of 0.1 mg of rhTSH or saline that did not contain any rhTSH 24, 48, or 72 hours before giving a small dose of RAI that would not harm the thyroid. The amount of RAI taken up by the thyroid was measured 24 and 96 hours later.

### WHAT WERE THE RESULTS OF THE STUDY?

Giving rhTSH 24 hours before the RAI increased the amount of RAI taken up by the thyroid 2-fold over baseline before the rhTSH treatment. The increase in the amount of RAI taken up by the thyroid was less if the rhTSH was given 48 hours before the RAI (1.8-fold increase) or 72 hours before the RAI (1.5-fold increase). The results showed that the increase in the amount of RAI taken up by the thyroid seen 24 hours after rhTSH was significantly higher than the increase seen in the 48 and 72 hour groups.

### HOW DOES THIS COMPARE WITH OTHER STUDIES?

Several studies have looked at the use of rhTSH to increase that amount of RAI taken up by goiters. The initial concerns were that rhTSH stimulation would increase the release of T<sub>4</sub> and T<sub>3</sub> from the thyroid and possibly cause some problems. The early studies showed this was not a problem. The dose of rhTSH used was also examined and the most safe and effective dose was found to be 0.1 mg. This dose is 1/3 of the dose used in thyroid cancer. The present study provides more information as to when the rhTSH should be given.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

In patients with multinodular goiters, the best time interval to increase the amount of RAI into the thyroid is 24 hours after rhTSH injection.

— Alan P. Farwell, MD

### ATA THYROID BROCHURE LINKS

Thyroid Nodules: [http://thyroid.org/patients/patient\\_brochures/nodules.html](http://thyroid.org/patients/patient_brochures/nodules.html)

Radioactive Iodine Therapy: [http://thyroid.org/patients/patient\\_brochures/radioactive.html](http://thyroid.org/patients/patient_brochures/radioactive.html)



## **GOITER**, continued

### ABBREVIATIONS & DEFINITIONS

**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.

**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

**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™.

**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)