



THYROID CANCER

Prediction of thyroid cancer recurrence

BACKGROUND

In general, patients with thyroid cancer do well after initial treatments that include surgery, thyroid hormone suppression with Levothyroxine and, frequently, radioactive iodine therapy. While most patients do not have a recurrence of their cancer, predicting the risk of thyroid cancer recurrence can be difficult. The American Thyroid Association (ATA) has recently developed a staging system for prediction of thyroid cancer recurrence based on certain clinical parameters. The goal of the first study was to examine the effectiveness of the ATA staging system combined with an assessment of response to therapy in predicting cancer recurrence.

In addition, many physicians use stimulated thyroglobulin levels to predict recurrence in thyroid cancer patients. Most often, recombinant human TSH (rhTSH) is used in the stimulation testing. Current guidelines suggest that patients treated with radioactive iodine undergo stimulated thyroglobulin testing about 1 year after initial radioiodine treatment. Some have suggested that if the stimulated thyroglobulin level is undetectable or very low ($< 1\text{ ng/ml}$), then the patient is at very low risk of recurrence and future stimulated thyroglobulin testing may not be needed. The goal of the second study was to determine how effective is stimulation testing with rhTSH in predicting thyroid cancer recurrence.

THE FULL ARTICLE TITLES:

Tuttle RM et al. Estimating risk of recurrence in differentiated thyroid cancer after total thyroidectomy and radioactive iodine remnant ablation: using response to therapy variables to modify the initial risk estimates predicted by the new American Thyroid Association staging system. *Thyroid* 2010;20:1341-9. Epub October 29, 2010.

Kloos RT. Thyroid cancer recurrence in patients clinically free of disease with undetectable or very low serum thyroglobulin values. *J Clin Endocrinol Metab* 2010;95:5241-8. Epub September 15, 2010.

SUMMARY OF THE STUDIES

In the first study, 588 thyroid cancer patients from Memorial Sloan-Kettering Cancer Center were studied. Patients were categorized using the ATA staging system as low risk (23% of patients), intermediate risk (49% of patients) or high risk (27% of patients) of recurrence. Their response to initial therapy was determined to be either excellent, acceptable or incomplete based on suppressed and stimulated thyroglobulin levels, neck ultrasound and other imaging studies. Patients with an excellent or acceptable treatment response had a lower risk of recurrence than those with an incomplete response in all stages. Patients categorized as high risk by the ATA staging system who had an excellent response to treatment were at lower risk of recurrence than initially predicted. Thus, both response to treatment and stage are important in predicting thyroid cancer recurrence.

In the second study, 107 patients with thyroid cancer treated at The Ohio State University were studied. All patients underwent thyroidectomy followed by radioiodine treatment. All had thyroglobulin stimulation testing with rhTSH and were divided into the following groups: Group 1 - thyroglobulin $\leq 0.5\text{ ng/ml}$, Group 2 - thyroglobulin $0.6\text{--}2.0\text{ ng/ml}$ and Group 3 - thyroglobulin $> 2.0\text{ ng/ml}$. Thyroid cancer recurrence rates were as follows: Group 1 - 3%, Group 2 - 11% and Group 3 - 80%. This study demonstrated that a rhTSH stimulated thyroglobulin threshold of 2.5 ng/ml or greater indicated a high risk of thyroid cancer recurrence.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

These studies provide valuable information to physicians treating patients with thyroid cancer. While most patients do very well after their initial treatment, it is important to be able to identify those who do not. The demonstration that an excellent response to initial treatment could decrease the risk of recurrence in patients with otherwise advanced stage thyroid cancer provides hope for those individuals. For those with less advanced cancer at

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THYROID CANCER, continued

presentation, the use of stimulated thyroglobulin levels clearly helps identify those patients that warrant more aggressive follow-up as well as those that clearly are at low risk for recurrence. However, these studies also show that the low risk patients still have a low rate of recurrence, reinforcing the fact that thyroid cancer patients require long term cancer follow-up.

—Whitney Woodmansee, MD

ATA THYROID BROCHURE LINKS

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

ABBREVIATIONS & DEFINITIONS

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 in patients that do not have thyroglobulin antibodies.

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.

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.

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).

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™.

Stimulated thyroglobulin testing — this test is used to measure whether there is any cancer present in a patient that has previously been treated with surgery and radioactive iodine. TSH levels are increased, either by withdrawing the patient from thyroid hormone or treating the patient with recombinant human TSH, then levels of thyroglobulin are measured. Sometimes this test is combined with a whole body iodine scan.

Cancer recurrence — this occurs when the cancer comes back after an initial treatment that was successful in destroying all detectable cancer at some point.