



THYROID CANCER

WHAT IS THE STUDY ABOUT?

Radiation doses delivered to extrathyroidal tissues by ^{131}I is significantly lower in euthyroid patients treated with recombinant human thyrotropin than in hypothyroid patients undergoing thyroid hormone withdrawal.

THE FULL ARTICLE TITLE: Radiation doses delivered to extrathyroidal tissues by ^{131}I is significantly lower in euthyroid patients treated with recombinant human thyrotropin than in hypothyroid patients undergoing thyroid hormone withdrawal. Remy H, Borget I, Lebouilleux S, Guilabert N, Lavielle F, Garsi J, Bournaud C, Gupta S, Schlumberger M, Ricard M. ^{131}I Effective Half-Life and Dosimetry in Thyroid Cancer Patients. *J Nucl Med* 2008;49:1445-50. <http://www.ncbi.nlm.nih.gov/pubmed/18703593?dopt=Citation>

WHAT IS KNOWN ABOUT THE PROBLEM BEING STUDIED?

There is strong evidence that ^{131}I treatment of thyroid cancer may induce a very small number of extrathyroidal cancers and leukemia, making it imperative that precautionary measures be exercised in the use of ^{131}I treatment of patients with differentiated thyroid carcinoma, especially young patients who generally have a good prognosis and long life expectancy, leaving them at risk of second tumors over many years. One measure is to use the smallest amount of ^{131}I that can effectively treat the patient. The other measure is to employ safeguards that might lower the extent of total body radiation from ^{131}I . Recent studies suggest that preparing patients with recombinant human thyrotropin (rhTSH) may favorably influence the effective half-life of ^{131}I and the absorbed doses by extrathyroidal organs. However, there still are uncertainties about the extent to which this occurs, and this issue requires further study.

WHAT WAS THE AIM OF THE STUDY?

This study was aimed at identifying the extent of tissue radiation that was delivered after preparation with thyroid hormone withdrawal (THW) and with rhTSH.

WHO WAS STUDIED?

Whole-body retention of ^{131}I was measured in 254 patients with papillary or follicular thyroid cancer, and repeated quantitative whole-body scans and measurements of the urinary excretion of ^{131}I were performed on 30 of these patients.

HOW WAS THE STUDY DONE?

This is a prospective study of patients with differentiated thyroid carcinoma treated with ^{131}I at Institut Gustave Roussy in Paris between December 2004 and June 2007, some of whom were prepared for treatment by THW for 5 weeks, during which triiodothyronine was administered for 3 weeks and total withdrawal was performed for 2 weeks, and others were treated

with 0.9 mg of rhTSH on two consecutive days during which the patients continued to take levothyroxine in preparation for treatment with ^{131}I . The amount of tissue radiation was compared in patients undergoing THW in preparation for ^{131}I therapy, with those undergoing preparation with recombinant human TSH.

WHAT WERE THE RESULTS OF THE STUDY?

The Mean effective half-life of ^{131}I is shorter by 31% in euthyroid patients treated with rhTSH compared with that in hypothyroid patients undergoing THW, which significantly decreases the radiation doses delivered to extrathyroidal tissues. Combined with smaller amounts of ^{131}I , the amount of whole body radiation delivered by ^{131}I remnant ablation can be substantially reduced. What this means is that much less irradiation is delivered to normal tissues with rhTSH without interfering with the effectiveness of the drug in treating thyroid tissues.

HOW DOES THIS COMPARE WITH OTHER STUDIES?

The results of this study added complementary new information to studies done on this subject

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Preparation with rhTSH and using lower doses of ^{131}I reduces the risk of developing non-thyroid tissue and organ damage from ^{131}I .

ABBREVIATIONS & DEFINITIONS

TSH Thyroid stimulating hormone (thyrotropin) is a pituitary hormone that stimulates the release of thyroid hormone from the thyroid gland. TSH levels increase when the thyroid gland fails to make sufficient thyroid hormone.

Recombinant human TSH Diagnostic and treatment tools have also improved in recent years such as sensitive assays for serum thyroglobulin measurement, neck ultrasonography, and recombinant human thyrotropin (rhTSH). This drug is now approved by the Federal Drug Administration (FDA) for both diagnostic use and for treatment with ^{131}I for thyroid remnant ablation after initial surgery. More information about the guidelines for the use of this drug are available at the following Web links for the American Thyroid Association Guidelines for the management of thyroid cancer: <http://www.thyroid.org/professionals/publications/documents/Guidelinsthy2006.pdf>

Euthyroid is normal thyroid function.

Effective Half-life is a combination of the time (hours) that radioiodine remains in a cell and the half life of the radioisotope (^{131}I) which is about 8 hours during which the radioactivity slowly abates.