



## THYROID CANCER

### Determining the ideal dose of radioactive iodine in the treatment of thyroid cancer

#### BACKGROUND

The first step in the treatment of the patient with thyroid cancer is a thyroidectomy to remove the thyroid gland. Following surgery, many patients are treated with radioactive iodine (I-131), particularly those with more advanced cancer. Radioactive iodine is given as a pill and the radiation is concentrated within thyroid cells with the goal of killing any cancerous tissue that may remain as well as any remaining normal thyroid tissue. However, choosing the right dose of I-131 which will maximize its cancer-killing effect yet minimize the risk of side effects can be difficult. Dosimetry is a way of calculating the maximum dose of I-131 that can be given, while trying to minimize the effects on organs such as the bone marrow. While more accurate, dosimetry is not commonly used because it is very time consuming and because there is no evidence to show that it is any better than empirically choosing a dose of radioactive iodine. The current study compared the effectiveness of dosimetry to empiric doses of I-131 in patients with advanced thyroid cancer.

#### THE FULL ARTICLE TITLE:

Klubo-Gwiedzinska J, et al. Efficacy of dosimetric versus empiric prescribed activity of <sup>131</sup>I for therapy of differentiated thyroid cancer. *J Clin Endocrinol Metab* 2011;96:3217-25. Epub August 17, 2011.

#### SUMMARY OF THE STUDY

The authors studied 87 patients with advanced thyroid cancer who were treated with radioactive iodine at two Washington, DC area hospitals between 2006-2009. One hospital (43 patients) used dosimetry to determine the dose of I-131, whereas the other hospital (44 patients)

used empiric doses. The doses calculated using the dosimetric approach were larger than those using the empiric method, yet the number of patients experiencing side effects was the same in both groups. A larger number of patients with cancer that had spread into the neck had complete remission of their cancer (5 out of 14 (35.7%)) with the larger doses from the dosimetric method as compared to 1 out of 30 (3.3%) treated with empiric doses. However, patients who had the spread of thyroid cancer outside the neck (metastatic cancer) had the same response to the I-131 regardless of whether the dose was calculated by dosimetry or empirically.

#### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study suggests that in patients with advanced thyroid cancer that has spread outside the thyroid but is still limited to the neck, it may be more effective to calculate the dose of I-131 using dosimetry rather than to give empiric doses. There appears to be no difference in response in patients with thyroid cancer that has spread outside the neck (metastatic cancer) with either method. However, these results need to be confirmed in much larger studies, since this was a relatively small study.

— Philip Segal, 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)

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

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## **THYROID CANCER**, continued

### **ABBREVIATIONS & DEFINITIONS**

**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.

**Metastatic Thyroid Cancer:** Thyroid cancer that has spread to organs and tissues outside of the neck.

**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).

**Dosimetry:** the calculation of a dose of I-131 that will maximize the dose into the remaining cancer while minimizing exposure to other organs and tissues. It is a time consuming procedure that is usually performed in only specialized situations. It is often performed by a professional medical dosimetrist with specialized training in the field and is usually only performed in special centers.

**Empiric dosing:** this method chooses standard dosing of I-131 based on the treating physician's decision. This is the most common method for choosing a dose of I-131 for treating thyroid cancer.