



## HYPERTHYROIDISM

### Does radioactive iodine therapy for Graves' disease cause cancer?

#### BACKGROUND

Graves' disease is the most common cause of hyperthyroidism. Radioactive iodine therapy has been available as a treatment option for patients with hyperthyroidism since the 1940s. While very high doses of radioactive iodine (>400 mCi) have been associated with increasing the risk for cancer, the relatively low doses typically used to treat hyperthyroidism (5-20 mCi) have been thought to result in minimal, if any, increased cancer risk. To address this concern, the Cooperative Thyrotoxicosis Therapy Follow-up Study (CTTFS) has been following >35,000 patients with hyperthyroidism (due to either Graves' disease or overactive thyroid nodules) in the United States and the United Kingdom who were treated with radioactive iodine therapy between 1946 and 1964. In 1998, data from this study demonstrated that radioactive iodine therapy for hyperthyroidism was not associated with an increased risk of dying of cancer. In the current study, the authors extend analysis of the previous CTTFS by including an additional 24+ years of patient follow-up and by using a new method to examine exposure of the body to radioactive iodine, in order to assess the associations between radioactive iodine therapy for the treatment of hyperthyroidism and overall death from cancer.

#### THE FULL ARTICLE TITLE

Kitahara C et al 2019 Association of radioactive iodine treatment with cancer mortality in patients with hyperthyroidism. *JAMA Intern Med.* Epub 2019 Jul 1. PMID: 31260066.

#### SUMMARY OF THE STUDY

The CTTFS included patients who received radioactive iodine therapy for hyperthyroidism at 24 U.S. medical centers and 1 U.K. site between 1946 and 1964. Patients were followed through 1968 with office visits and laboratory measurements; subsequent clinical follow-up was obtained from medical records, patient questionnaires, and national databases that included the U.S. Social Security Administration and the U.S. National Death Index. Of the 35,630 patients in the CTTFS, only the

18,805 radioactive iodine-treated patients with complete records and who did not have a cancer diagnosis prior to radioactive iodine therapy were included in the current analysis.

Of the 18,805 patients analyzed, the average age at study entry was 49 years, 78% were female and 93.7% had Graves' disease. The average total dose of radioactive iodine was 10.1 mCi for patients with Graves' disease and 17.6 mCi for patients with autonomous thyroid nodules; 34.1% of the patients received two or more radioactive iodine treatments. During the average follow-up of 26 years, there appeared to be a statistically significant dose-response relationship for death from breast cancer (12% increased risk) and from all solid cancers combined (5% increased risk). In subgroup analyses, the increased mortality risk from all solid cancers persisted in patients receiving only 1 dose of radioactive iodine but was no longer significant for breast cancer. There was no statistically increased risk for deaths related to leukemia, non-Hodgkin lymphoma, multiple myeloma, or thyroid cancer. The authors estimate that 14% of breast cancer deaths and 7% of all other solid-cancer deaths were attributed to radioactive iodine exposure in this group.

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

This is an important study as it suggests that there is indeed an increased risk of some solid cancers after radioactive iodine therapy for hyperthyroidism, something that prior studies failed to show. While there is data to show a slight increase in cancers in patients treated with high dose radioactive iodine therapy for thyroid cancer, this is the 1st study to suggest there is an increased risk after low dose radioactive iodine therapy. Additional studies are needed to confirm this study and to clarify the risks and benefits of low dose radioactive iodine therapy for hyperthyroidism, especially as compared to medical therapy with anti-thyroid drugs and surgery.

— Alan P. Farwell, MD, FACE





**HYPERTHYROIDISM, continued**

**ATA THYROID BROCHURE LINKS**

Radioactive Iodine: <https://www.thyroid.org/radioactive-iodine/>

Graves' Disease: <https://www.thyroid.org/graves-disease/>

Hyperthyroidism (Overactive): <https://www.thyroid.org/hyperthyroidism/>

**ABBREVIATIONS & DEFINITIONS**

**Hyperthyroidism:** a condition where the thyroid gland is overactive and produces too much thyroid hormone. Hyperthyroidism may be treated with antithyroid meds (Methimazole, Propylthiouracil), radioactive iodine or surgery.

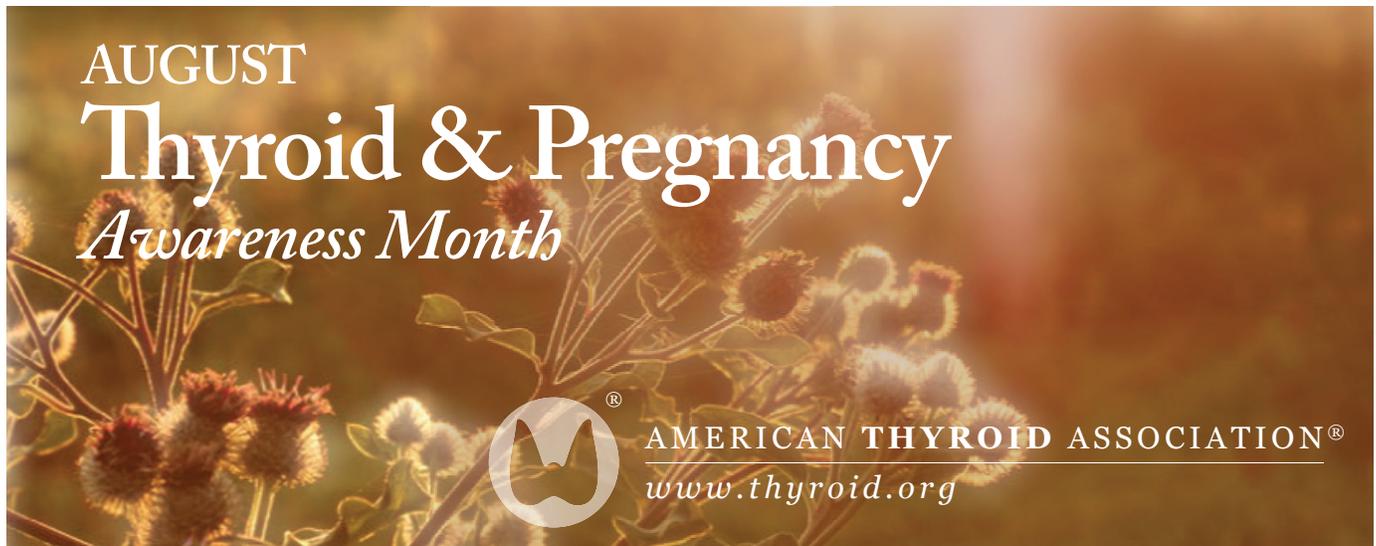
**Graves' disease:** the most common cause of hyperthyroidism in the United States. It is caused by antibodies that attack the thyroid and turn it on.

**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).

**mCi:** millicurie, the units used for I-131. Typical doses for hyperthyroidism are 5-15 mCi, while doses for thyroid cancer range from 30-200 mCi.

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