



Comparison of Administration of Recombinant Human Thyrotropin with Withdrawal of Thyroid Hormone for Radioactive Iodine Scanning in Patients with Thyroid Carcinoma

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Source: [The New England Journal of Medicine -- September 25, 1997 -- Volume 337, Number 13](#)

Thyroid carcinoma is diagnosed in approximately 14,000 people in the United States each year. Thyroid cancers can be categorized into three main groups by the cell type: 1) Well differentiated - which includes follicular and papillary; 2) Anaplastic and 3) Medullary. The natural history and treatment of these three types of **thyroid cancer** are very different. The most common of the three are the well differentiated thyroid cancers. These cancers are usually very slow growing and are uncommonly fatal.

The treatment of well differentiated thyroid cancer includes surgery to remove the cancer and surrounding thyroid gland followed by thyroid hormone suppression, radioiodine treatments and, occasionally, radiation therapy. The reasoning for utilizing adjuvant treatment modalities after surgery is based on the fact that surgery may not completely remove all of the cancer. Radioiodine and radiation therapy take advantage of thyroid cancers' sensitivity to high energy x-rays. Many cancer centers recommend radioiodine treatments for all patients after surgery while others reserve this treatment for selected patients. Radiation therapy is usually only recommended if there is gross residual cancer after surgery.

The reasoning behind thyroid hormone suppression treatment is based on the fact that well differentiated thyroid cancers are hormone responsive (ie, these cancers often need the hormone thyrotropin to survive and grow). Thyrotropin is produced by the pituitary gland and stimulates the thyroid to synthesize and secrete thyroid hormone. By administering thyroid hormone exogenously (in the form of pills) the production of thyrotropin is blocked by a negative feedback loop.

Following treatment patients are followed every year by their physicians who should perform a careful history and physical examination and draw blood for thyroid hormone levels. One test that is often obtained to detect whether or not the cancer has recurred is radioiodine scanning. For this test to be sensitive for recurrent disease, thyrotropin levels must be very high before the scan is performed. To produce these high levels, all thyroid hormone treatments must be discontinued for several weeks before the scan which produces a state of hypothyroidism, a condition associated with many undesirable symptoms. In addition, even after discontinuation of thyroid hormone, thyrotropin levels may not reach significant levels for optimal imaging and occasional cases of accelerated tumor growth have been reported during the time the thyroid hormone is stopped. To overcome these problems associated with discontinuing thyroid hormone prior to radioiodine scanning, researchers have examined the administration of recombinant human thyrotropin prior to scanning. This new technique is the basis for the study reported in the September 25, 197 New England Journal of Medicine.

One hundred twenty seven patients with well differentiated thyroid cancer underwent whole-body radioiodine scanning by two techniques: One, after the discontinuation of thyroid hormone and , two, with thyroid hormone continued after the administration of two doses of recombinant thyrotropin. The scans were evaluated by physicians blinded to the pre-scan regimen. Sixty-two patients had positive scans with one or both techniques. In 66 percent of cases the scans obtained with thyrotropin were equivalent to those obtained after thyroid hormone withdrawal. However, in almost one third of cases the thyrotropin technique produced inferior scans, and 13 patients were treated with radioiodine for suspected recurrent or residual thyroid cancer based solely on the scan using the withdrawal technique. 18 scans read as negative following administration of recombinant thyrotropin were read as positive with the withdrawal technique.

The authors conclude that even though the thyrotropin technique was associated with significantly fewer symptoms and dysphoric mood states and does stimulate radioiodine uptake , the sensitivity of scanning after administration of thyrotropin is less than that after the withdrawal of thyroid hormone.

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