



THYROID CANCER

Salivary gland damage associated with dose of radioactive iodine received in papillary thyroid cancer treatment

BACKGROUND

Papillary thyroid cancer is the most common thyroid cancer. Overall, the prognosis of papillary thyroid cancer is very good because of the effective treatments available. Most patients are treated with surgery first, followed by thyroid hormone suppression. For patients at higher risk of thyroid cancer recurrence, radioactive iodine therapy following surgery is very effective in seeking out and destroying thyroid cancer cells. Radioactive iodine works by being taken up and concentrated in the thyroid cancer cells and killing them with the radiation. A few other cells in the body, such as those in the salivary and parotid glands, also take up radioactive iodine but do not concentrate it so the radiation usually does little or no damage. However, high doses of radioactive iodine therapy can cause salivary gland damage, known as chronic sialadenitis (inflammation of the salivary gland). While usually mild, it can be severe and is the most common adverse side effect of radioactive iodine therapy. Imaging of the neck with an ultrasound can detect salivary gland damage due to radioactive iodine therapy. The purpose of this study is to determine how often ultrasound-detected sialadenitis and parotid gland damage is noted due to radioactive iodine therapy and to identify risk factors associated with salivary gland damage.

THE FULL ARTICLE TITLE

Horvath E et al. 2020 Radioiodine-Induced Salivary Gland Damage Detected by Ultrasonography in Patients Treated for Papillary Thyroid Cancer: Radioactive Iodine Activity and Risk. *Thyroid* 2020 Jun 10. PMID: 32370663.

SUMMARY OF THE STUDY

Patients with papillary thyroid cancer who were treated with radioactive iodine therapy between 2007 and 2017 at a single institution were evaluated for this study. Patients included in the study had a preoperative (before removal of the thyroid) and post-radioactive iodine therapy neck ultrasound that included images of

the salivary glands. Patients with salivary gland disease prior to their diagnosis of papillary thyroid cancer were excluded. Patients were placed into groups based on the increasing radioactive iodine therapy dose administered: Group A (30-35 mCi), Group B (48-58 mCi), Group C (99-110 mCi), Group D (150-160 mCi) and Group E (200-500 mCi). Some of the patients completed a survey about their salivary gland symptoms. Ultrasound features were used to determine salivary gland damage after radioactive iodine therapy.

Of the 667 patients with papillary thyroid cancer treated with radioactive iodine therapy, 570 patients were included in this study. The study group consisted of 435 females (76.3%) with an average age of 43 years. The average radioactive iodine therapy dose received was 100 mCi. There were 143 patients (25.1%) with salivary gland damage on ultrasound and 77 (53.8%) of them had bilateral parotid gland atrophy (loss of tissue). The median follow up was 49 months. The risk of sialadenitis was significantly correlated with both radioactive iodine activity and gender (14.1 % of males had salivary gland damage compared to 28.5% of females). The main risk factor for salivary gland damage was the radioactive iodine dose received. No salivary gland injury was noted in 156 patients who received radioactive iodine therapy doses between 30 mCi and 58 mCi (Group A and B). In patients receiving 100 mCi, 150 mCi, and ≥ 200 mCi (Group C, D and E), atrophy was noted in 21%, 46.9% and 77.8% of patients, respectively. There were 54 patients who completed the salivary gland survey, and 16 of the patients with parotid atrophy (70%) reported parotid gland discomfort.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Chronic sialadenitis is one of the more common side effect of radioactive iodine therapy. This study shows that 25% of patients who receive radioactive iodine doses ≥ 100 mCi are affected. The main risk factor for salivary





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gland damage is the total radioactive iodine therapy dose received. Importantly, chronic sialadenitis was not observed at radioactive iodine doses <100 mCi. Using the lowest effective radioactive iodine therapy dose for

papillary thyroid cancer treatment can minimize damage to the salivary gland. Ultrasound is useful to diagnose post-radioactive iodine therapy salivary gland atrophy or damage.

— Priya Mahajan, MD

ATA THYROID BROCHURE LINKS

Thyroid Cancer (Papillary and Follicular): <https://www.thyroid.org/thyroid-cancer/>

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

ABBREVIATIONS & DEFINITIONS

Papillary thyroid cancer: the most common type of thyroid cancer. There are 4 variants of papillary thyroid cancer: classic, follicular, tall-cell and noninvasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP).

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.

Sialadenitis: inflammation of salivary gland.

Ultrasound: a common imaging test used to evaluate the structure of the thyroid gland and neck. Ultrasound uses sound waves to create a picture of the structure of the thyroid gland and surrounding neck.

mCi: millicurie, the units used for I-131.