



THYROID CANCER

Lemon juice increases the radiation exposure of salivary glands after Radioactive Iodine (RAI) treatment in patients with thyroid cancer

WHAT IS THE STUDY ABOUT?

After surgery for thyroid cancer, most patients are treated with radioactive iodine (I-131). This serves two functions: 1) destroy any remaining cancer cells anywhere in the body and 2) destroy any remaining normal thyroid tissue, thus allowing patients to be followed more easily for thyroid cancer return or persistence. I-131 is taken up not only by thyroid tissue, but also some other tissues in the body such as salivary glands. As a result, I-131 can damage the salivary glands, which are very sensitive to radiation. Because of this, the radiation sialadenitis (salivary gland inflammation) and xerostomia (dry mouth) are the most common complications of I-131 therapy, which can even occur with small amounts of I-131. Sour liquids, juices and drops with lemon have traditionally been used to increase saliva flow in an attempt to reduce radiation exposure of the salivary glands after RAI therapy. There are conflicting studies which suggest either no benefit or increased risk from these practices. This study examines the benefits/risks of salivary gland stimulation with lemon slices on radiation exposure to the glands immediately after RAI.

THE FULL ARTICLE TITLE:

Jentzen W et al. The influence of saliva flow stimulation on the absorbed radiation dose to the salivary glands during radioiodine therapy of thyroid cancer using (124) I PET(CT) imaging. *Eur J Nucl Med Mol Imaging* 2010. July 13 (Epub ahead of print).

WHAT WAS THE AIM OF THE STUDY?

The aim of this study was to determine the effect of chewing lemon slices immediately after RAI on salivary gland radiation exposure.

WHO WAS STUDIED?

The study group included 10 patients preparing for RAI therapy after surgery for thyroid cancer.

HOW WAS THE STUDY DONE?

The patient's all received a scanning dose of RAI after which they either chewed on lemon slices or did nothing. The patients in the lemon slice group began to chew for 20 minutes after the RAI test dose and throughout the day.

Serial scans were performed to determine the radiation absorption. In the non-lemon slice group, the patients were not allowed to eat (which would also have increased saliva flow) for 4 hours after the scanning dose to further minimize the radiation exposure of the salivary glands.

WHAT WERE THE RESULTS OF THE STUDY?

The absorbed radiation was about 28% less in the non-lemon slice group, especially in the parotid glands. Lemon slices increased the initial uptake of the RAI by salivary glands, but did not speed up the saliva flow out of the salivary glands with RAI. The net effect was to prolong the radiation exposure of the salivary glands in the lemon slice group.

HOW DOES THIS COMPARE WITH OTHER STUDIES?

A prior study reported in this journal ([Farahati, J. Salivary stimulation with vitamin C at any time after I-131 therapy has no major effect on salivary uptake of I-131 in *Clinical Thyroidology for Patients*, Vol 3, May 2010](#)) showed no effect of increasing salivary flow on radiation exposure. Other studies demonstrate increased risk of sialadenitis and other forms of damage to the salivary glands when saliva flow was stimulated with lemon drops immediately after RAI compared to lemon drop use delayed by 24 hours after treatment.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Salivary gland stimulation with lemon drops/slices/juice immediately after RAI treatment results in more radiation complications compared to a delay of 24 hours. The benefit of any lemon drops/slices salivary stimulation at any time after RAI treatment has not been proven. It is recommended that no salivary gland stimulation protocols with lemon drops/slices should be used until further studies discover a better method of reducing these radiation risks.

— Jerrold Stock, MD

ATA THYROID BROCHURE LINKS

Thyroid cancer: http://thyroid.org/patients/patient_brochures/cancer_of_thyroid.html

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THYROID CANCER, continued

ABBREVIATIONS & DEFINITIONS

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).

Sialadenitis — inflammation of salivary gland.

Xerostomia — dry mouth due to lack of saliva, frequently observed after radiation to the head and neck and after I-131 therapy.