

# Are We Missing Salivary-Gland Dysfunction Years After a Single <sup>131</sup>I Treatment for Thyroid Cancer?

### Albert G. Burger

Jeong SY, Kim HW, Lee SW, Ahn BC, Lee J. Salivary gland function five years after a radioiodine ablation in patients with differentiated thyroid cancer: direct comparison of pre and post-ablation scintigraphies and their relation to xerostomia symptoms. Thyroid. November 15, 2012 [Epub ahead of print].

#### **Background**

Chronic sialadenitis is a frequent complication of radioactive iodine therapy (RAI), even after a single RAI application (1). Some patients report some minor transient symptoms during the first few weeks following treatment. Today, salivary-gland function can be assessed by 99mTc pertechnate scintigraphy (SGS). Its diagnostic yield can be improved if it is performed before and after <sup>131</sup>I treatment, thus reducing interindividual variability. Information can be obtained by both 99mTc pertechnate uptake as well as by its release pattern from the salivary glands.

#### **Methods**

In this study, 214 subjects were studied before and approximately 5 years after a single <sup>131</sup>I treatment. Patients with head surgery or external radiation were excluded. The uptake of 99mTc and the ejection fraction (EF) of the tracer were evaluated. For measuring EF, lemon juice was sprayed in the oral cavity and the decrease of radioactivity was followed over 10 minutes. Each salivary gland was scored as follows: 0, normal uptake and secretion; 1, slightly decreased uptake; 2, moderately decreased uptake but still above background; and 3, uptake equal to background. EF was expressed as a percentage of the activity before administering the lemon juice. The RAI treatment was done in hypothyroidism, with doses ranging between 3.7 and 5.55 GBq (100 to 150 mCi). During the first 2 days, the patients were instructed to suck sour candies whenever awake and to drink at least 2 L of liquid. In case of salivarygland swelling, nonsteroidal antiinflammatory medications were given.

#### Results

Papillary thyroid cancer was present in 96% of the mainly female patients. In the majority of patients, the results for all four salivary glands were available. After 5 years, 35 patients (16%) reported a dry mouth. Symptoms of a dry mouth were more frequent with higher RAI doses (5.55 GBq, 18%; 3.7 GBq, 7.8%). The SGS before RAI was normal in 88% of 852 salivary glands. In the remaining glands, the uptake was slightly reduced but never undetectable (score, 3). Five years after <sup>131</sup>I treatment salivary-gland uptake was normal in 73.8% of patients (score, 0), slightly reduced in 7.9%, and moderately reduced in 6.7% of patients; no uptake was found in 11.6% (score, 3). A single salivary gland was affected in 78.6%, two glands in 49.5%, three glands in 6.9% and four glands in 8% of patients.

The EF after lemon juice was affected to a degree comparable to that of the uptake.

Subjective symptoms (dry mouth) were rarely reported in the presence of a minor decrease in SGS (score, 1). Clinical symptoms were mostly correlated with moderate to severe dysfunction of more than one salivary gland. Symptoms were more frequently reported with submandibular-gland dysfunction than with parotid-gland dysfunction.

#### **Conclusions**

In patients who underwent <sup>131</sup>I treatment of papillary cancer, salivary-gland scintigraphy was performed continued on next page

## AMERICAN THYROID ASSOCIATION

### Are We Missing Salivary-Gland Dysfunction Years After a Single <sup>131</sup>I Treatment for Thyroid Cancer?

Jeong SY, et al.

a few days before radioactive iodine treatment and approximately 5 years later. In most cases, the first scintigraphy was performed after withdrawal of thyroid hormone treatment, with a serum TSH of >30 mU/L. Patients received relatively large doses of <sup>131</sup>I—between 3.7 and 5.55 GBq of <sup>131</sup>I. Five years after a single radioactive iodine treatment, up to 20%

of all patients had salivary-gland dysfunction, but only 16% reported a dry mouth. In the majority of cases, only one to two salivary glands were affected, perhaps explaining the scarcity of symptoms. No major morphologic alterations of the salivary glands, such as constrictions of the secretory channels, were observed.

#### ANALYSIS AND COMMENTARY • • • • •

This large study certainly provides worthwhile information for endocrinologists who are treating patients with radioactive iodine. The currently recommended doses of <sup>131</sup>I are 1.1 to 1.85 GBq (30 to 50 mCi), which is markedly below the dose used in this study. Since the authors observed salivary-gland dysfunction more frequently in patients treated with the highest dose of 5.55 GBq, one is inclined to conclude that these complications will be rare, albeit not absent, with the currently recommended regimen.

No information was provided on how to improve salivary-gland dysfunction. The authors mention one study claiming improvement, but they rightly suggest that this should be tested on a larger scale (2).

The salivary glands are not the only tissue equipped with a mechanism for actively transporting iodide. For instance, the gastric and colonic mucosa avidly transport iodide and the follicular cells of the ovaries have the same capacity . Several relevant publications on this subject are available, but to my knowledge, little information obtained with modern technology, as used here, has yet been reported. The possibility of damage in tissues others than the thyroid after <sup>131</sup>I therapy, especially secondary malignancies, remains a major concern (3-5).

#### References

- 1. Grewal RK, Larson SM, Pentlow CE, Pentlow KS, Gonen M, Qualey R, Natbony L, Tuttle RM. Salivary gland side effects commonly develop several weeks after initial radioactive iodine ablation. J Nucl Med 2009;50:1605-10. Epub September 16, 2009.
- 2. Silberstein EB. Reducing the incidence of <sup>131</sup>I-induced sialadenitis: the role of pilocarpine. J Nucl Med 2008;49:546-9. Epub March 14, 2008.
- 3. Metso S, Auvinen A, Huhtala H, Salmi J, Oksala H, Jaatinen P. Increased cancer incidence after radioiodine treatment for hyperthyroidism.

- Cancer 2007;109:1972-9. [Erratum, Cancer 2007;110:1875.]
- 4. Sawka AM, Thabane L, Parlea L, Ibrahim-Zada I, Tsang RW, Brierley JD, Straus S, Ezzat S, Goldstein DP. Second primary malignancy risk after radioactive iodine treatment for thyroid cancer: a systematic review and meta-analysis. Thyroid 2009;9:451-7.
- 5. Hieu TT, Russell AW, Cuneo R, Clark J, Kron T, Hall P, Doi SA. Cancer risk after medical exposure to radioactive iodine in benign thyroid diseases: a meta-analysis. Endocr Relat Cancer 2012;19:645-55.