

## Summary

### Background:

Although radioactive iodine 131 (RAI) has been successfully used in differentiated thyroid cancer (DTC) patients therapy for more than 70 years, thus far published data regarding RAI-induced salivary glands functional impairment have been inconsistent. Due to the trend towards using lower activities or even RRA omission, the possible RAI untoward effects have been widely discussed.

### Aim:

To evaluate and quantify salivary gland function in thyroidectomised DTC patients before and after RRA using activity of 3.7 GBq and to compare salivary gland functional changes in DTC patients after single or repeated RAI treatment (using activities  $\geq 5.5$  GBq) with their age- and sex-matched RAI-naive counterparts using salivary gland scintigraphy with  $^{99m}\text{Tc}$ -pertechnetate. In addition, we performed subjective symptoms evaluation.

### Patients and Methods:

Salivary gland scintigraphy (SGS) was performed in 31 RAI-naive patients (6 men, 25 women, median age 52 years) before and 4.6 months after RRA. Salivary gland function was measured also in 23 patients (7 men, 16 women, median age 60 years) with RAI administration history and compared with their age- and sex-matched counterparts.

Non-parametric Wilcoxon and Mann-Whitney tests were used (due to non-normal data distribution) for statistical analysis. A  $p$  value  $< 0.05$  was considered significant.

Radiation Therapy Oncology Group Modified University of Washington Head and Neck Symptom Scale was used for subjective symptoms evaluation. A mean change score  $\geq 5$  points was considered meaningful.

### Results:

No significant differences in salivary gland accumulation or excretion functions were observed in patients after RRA using activities 3.7 GBq. For the individual variables the calculated power for minimum relevant difference 25 % and sample size 31 ranged between 86 % and 96 %. Statistically significant decrease in parotid glands excretion was observed in those treated with activities  $> 5.55$  GBq ( $p = 0.031$ ) but in parotid accumulation only in those previously treated with activities  $> 9.25$  GBq ( $p = 0.034$ ). In submandibular glands, no statistically significant difference in either function was observed even with RAI activity  $> 9.25$  GBq. No substantial subjective symptoms worsening was reported after RRA except for taste disturbances almost reaching 5 points border.

### Conclusions:

Our data suggest that concerns about putative salivary gland functional deterioration after RAI administration of activities  $\leq 5.5$  GBq is probably unjustified. Patients may suffer from taste disturbances after RRA.

On the other hand, higher activities may lead to a significant decrease in parotid gland functions.

Fortunately, submandibular salivary glands, producing vast majority of saliva (under basal conditions) seem to be preserved also in patients treated with high cumulative activities, which is of great importance for their oral and global health maintenance.

### Keywords:

radioactive iodine  $^{131}\text{I}$ , thyroid cancer, salivary gland scintigraphy,  $^{99m}\text{Tc}$ -pertechnetate

