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RADIOIODINE THERAPY FOR THYROID CANCER AND DYSFUNCTION OF THE SALIVARY AND LACHRYMAL GLANDS IN THE START STUDY: RESULTS AT 6 MONTHS FOLLOW-UP

Clémence BAUDIN¹, Alice BRESSAND², Camille BUFFET³, Fabrice MENEGAUX^{3,4,5}, Marine SORET^{3,6}, David BROGGIO⁷, Céline BASSINET⁸, Christelle HUET⁸, Laurence LEENHARDT³, Marie-Odile BERNIER¹, Charlotte LUSSEY-LEPOUTRE^{3,9,10}

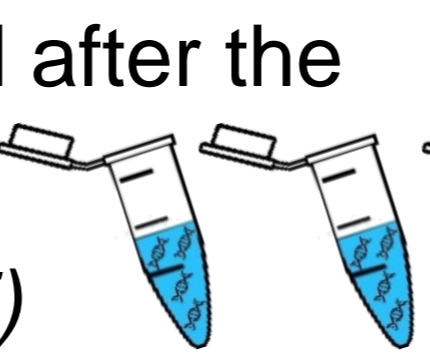
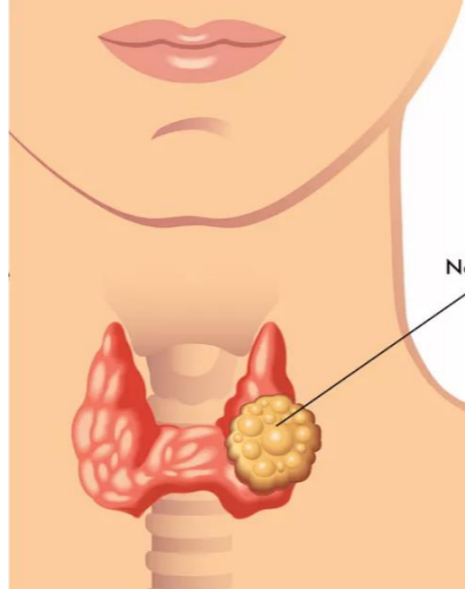
CONTEXT

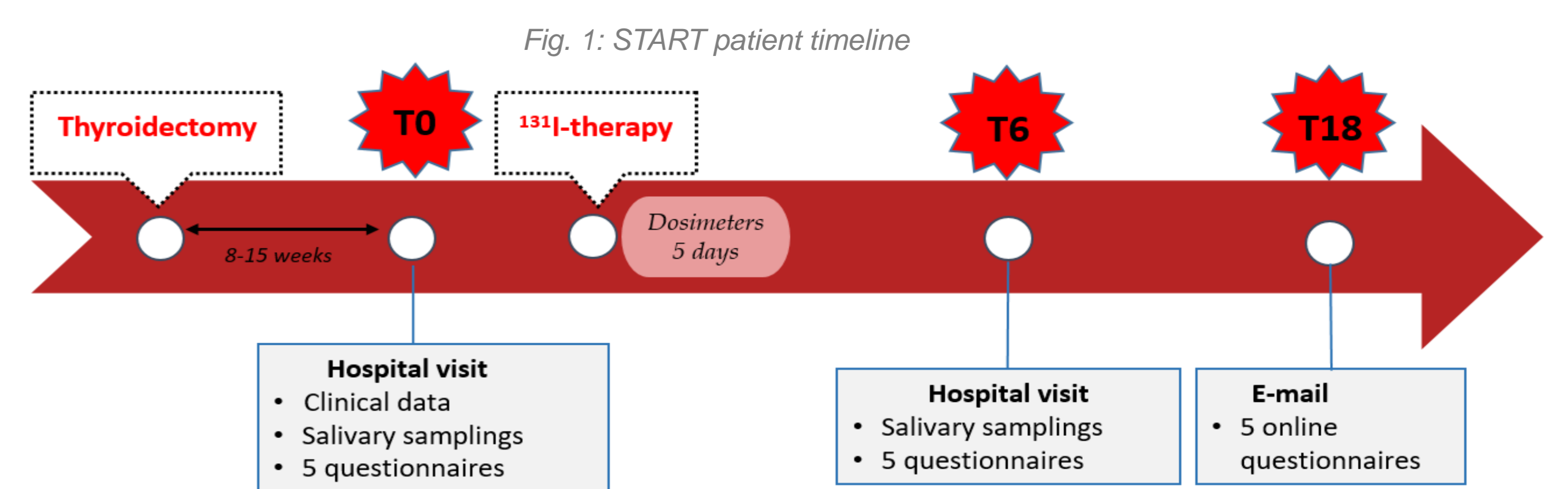
Understanding of changes in salivary and lachrymal gland functions after radioiodine therapy (¹³¹I-therapy) remains limited; and, to-date **no studies have evaluated dose-response relationships between absorbed dose from ¹³¹I-therapy and dysfunctions of these glands.**

OBJECTIVES

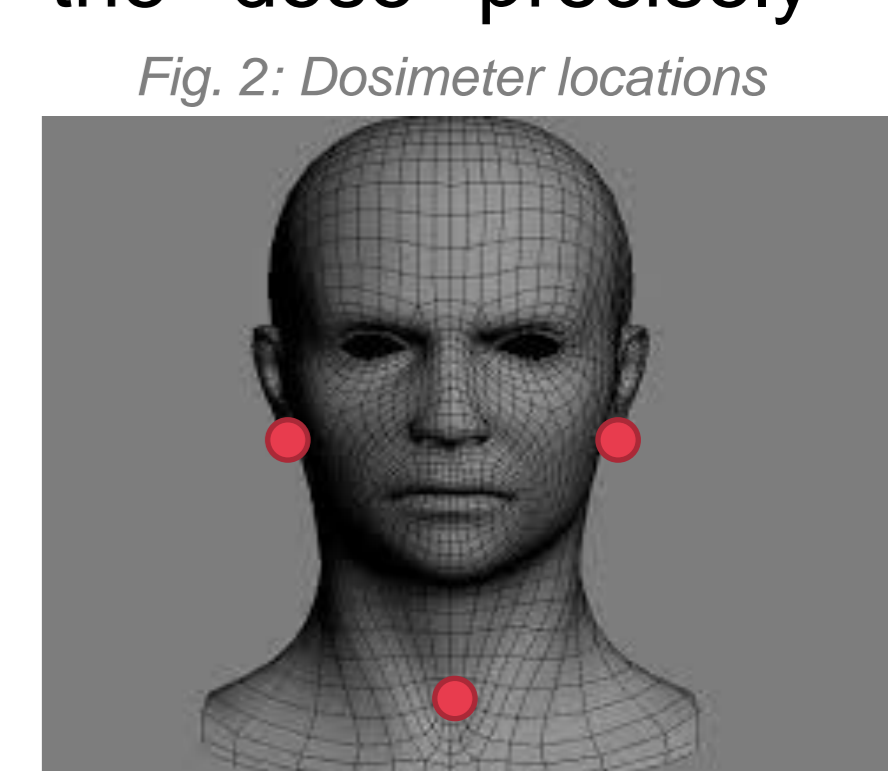
- 1) to **estimate the incidence** of salivary/lachrymal dysfunctions at 6 months after ¹³¹I-therapy,
- 2) to **identify ¹³¹I-therapy related risk factors** for salivary/lachrymal dysfunctions,
- 3) to **assess relationships** between ¹³¹I-therapy radiation dose and these dysfunctions

MATERIAL and METHODS

- **Population** : 139 patients, candidates for a ¹³¹I-therapy for differentiated thyroid cancer (Pitié-Salpêtrière hospital)
 - 2 groups : 44 patients treated by 1.1 GBq
 - 92 patients treated by 3.7 GBq
- **Inclusion** : the day of the therapy, immediately before radioiodine administration (T0)
- **Follow-up**: at 6 (T6) and 18 (T18) months after therapy (Fig. 1)
- **Outcomes: salivary and lachrymal dysfunctions**
 - ✓ Saliva samples: volume measurements before and after the stimulation of salivary glands
 - ✓ Salivary dysfunctions question (E. Moreddu, 2017)  "Have you noticed a lack of saliva since the radioiodine therapy?"
 - ✓ Dry eyes (OSDI © questionnaire)
- **Other factors of interest**
 - ✓ Quality of life (MOS SF-36)
 - ✓ Nutrition (EVA of ingesta)
 - ✓ Anxiety and depression symptoms (HAD scale) 



- **Dosimetry**:
 - ✓ 3 external thermoluminescent dosimeters (Fig. 2)
 - ✓ positioned at T0 (immediately before radioiodine administration), removed 5 days later (Fig. 1)
 - ✓ Dosimetric reconstruction → calculation of the dose precisely received by the salivary glands (MD)
- **Statistical analyses**:
 - ✓ Descriptive analyses
 - ✓ Paired comparisons tests
 - ✓ Random-effects multivariate logistic and linear regressions adjusted for age at the time of interview, anxiety and depression score (HAD scale), history of systemic diseases, menopause status, and painkillers intake in the last 3 months



RESULTS

Table 1: Baseline characteristics of the START population

Variables	Categories	Total
Gender ^a	women	97 (71.3)
	men	39 (28.7)
Age at inclusion (years) ^b		47.1 (14.1)
Cancer histology ^a	Follicular	20 (14.7)
	Papillary	116 (85.3)
pTNM staging ^a	Tx-T2	101 (74.8)
	T3-T4	34 (25.2)
	Nx-N0	76 (55.9)
	N1	60 (44.1)
History of systemic disease ^a	Yes	40 (29.4)
	No	
History of salivary dysfunctions ^a	Yes	7 (5.1)
	No	
HAD score ^b at T0		11.6 (6.4)

The START study includes 71% of women and 29% of men, aged 47.1 (±14.1) years on average at baseline (Table 1).

- **Incidences** of salivary and lachrymal dysfunctions ranged from 4 to 22% depending on the indicator.
- Age, menopause, depression and anxiety symptoms, history of systemic disease, and not taking painkillers in the last 3 months were found to be **risk factors for salivary or lachrymal disorders.**
- **Significant associations** were found between ¹³¹I-exposure and salivary or lachrymal disorders adjusted on the previous variables (Table 2).

Table 2: Random-effects multivariate logistic and linear regressions results

Variable ^a	Categories	N	Dry mouth sensation		Unstimulated saliva flow (mL/min)		Stimulated saliva flow (mL/min)		K ^o concentration (mmol/L)		OSDI score	
			OR	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI
MD (Gy)		129	1.43	(1.01-2.04)	0.00	(-0.03;0.03)	-0.08	(-0.12;-0.02)	1.07	(0.42;1.71)		n/a
AA	Before treatment	136	1	ref	1	ref	1	ref	1	ref	1	ref
	1100 MBq	91	2.99	(1.07-8.39)	-0.01	(-0.10;0.08)	-0.26	(-0.44;-0.08)	-0.05	(-2.08;1.98)	4.07	(0.42;7.73)
	3700 MBq	41	2.37	(1.01-5.58)	-0.01	(-0.07;0.07)	-0.15	(-0.29;-0.02)	3.10	(1.56;4.64)	1.57	(-1.24;4.37)

^a Exposure indicators introduced separately in the models; ^b Potassium; MD: mean of absorbed dose to the right and left salivary glands; AA: Administered activity of ¹³¹I. n/a: not applicable.

DISCUSSION

This study brings **new knowledge on the relationship between the absorbed dose to the salivary glands from ¹³¹I-therapy and salivary/lachrymal dysfunctions** in thyroid cancer patients 6 months after ¹³¹I-therapy.

The results do not show any obvious clinical disorders after the ¹³¹I-therapy.

Nevertheless, by identifying risk factors, this study encourages clinicians to adapt the therapy for patients at risk of salivary/lachrymal complications.

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¹ Laboratory of Epidemiology, Institut de Radioprotection et de Sûreté Nucléaire, Fontenay-aux-Roses, France; ² AMAREXIA France, F-75016, Paris, France; ³ Thyroid disease and Endocrine Tumor Department, Pitié-Salpêtrière Hospital APHP, Sorbonne University, Groupe de Recherche Clinique Tumeurs Thyroïdiennes n° 16 F-75013, Paris, France; ⁴ Sorbonne University, Department of General and Endocrine Surgery, AP-HP, Pitié-Salpêtrière Hospital, F-75013, Paris, France; ⁵ Sorbonne University, Department of Nuclear Medicine, AP-HP, Pitié-Salpêtrière Hospital, F-75013, Paris, France; ⁶ Sorbonne University, CNRS, INSERM, Biomedical Imaging Laboratory, LIB, F-75006, Paris, France; ⁷ Internal Dose Assessment Laboratory, Institut de Radioprotection et de Sûreté Nucléaire, Fontenay-aux-Roses, France; ⁸ Ionizing Radiation Dosimetry Laboratory, Institut de Radioprotection et de Sûreté Nucléaire, Fontenay-aux-Roses, France; ⁹ Sorbonne University, Unit of Radionuclide Treatment, Nuclear medicine department, AP-HP, Pitié-Salpêtrière Hospital, F-75013, Paris, France; ¹⁰ PARCC, INSERM, Equipe Labellisée par la Ligue contre le Cancer, F-75015, Paris, France