



## Radioiodine therapy for thyroid cancer and dysfunction of the salivary and lachrymal glands in the START study: results at 6 months follow-up

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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**

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**CONTEXT**

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

**OBJECTIVES**

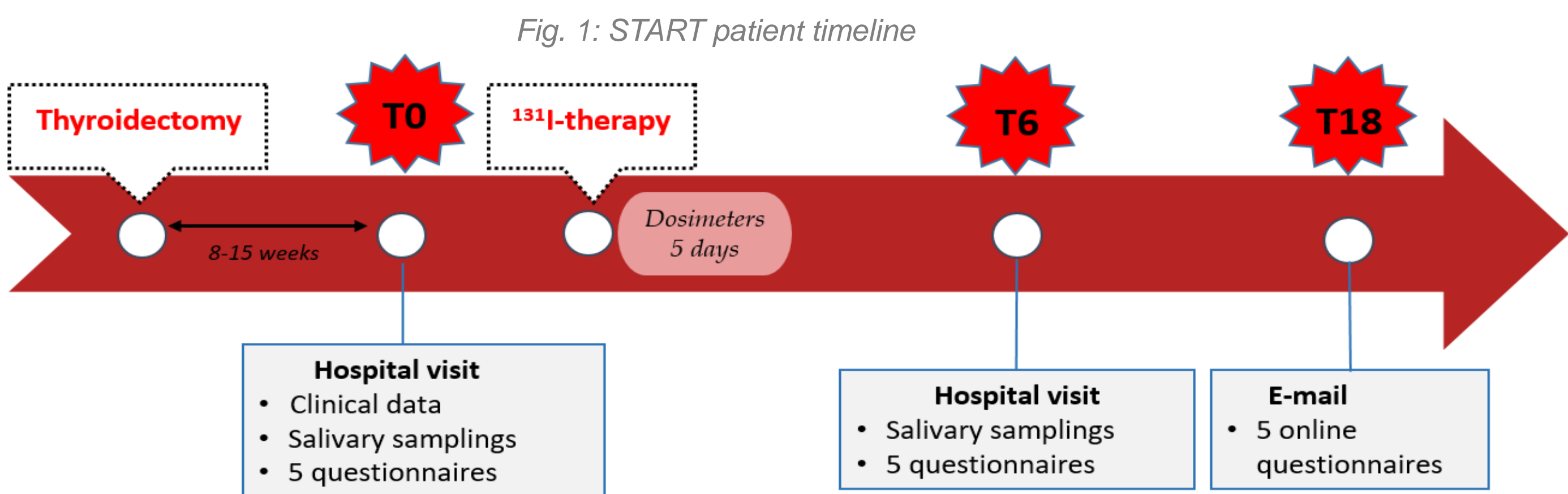
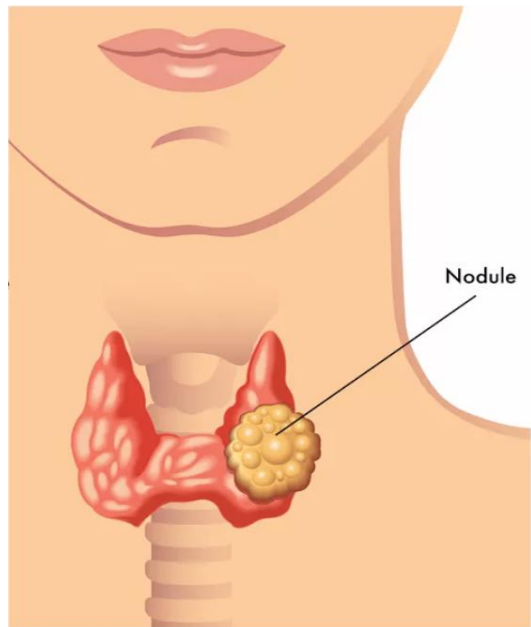
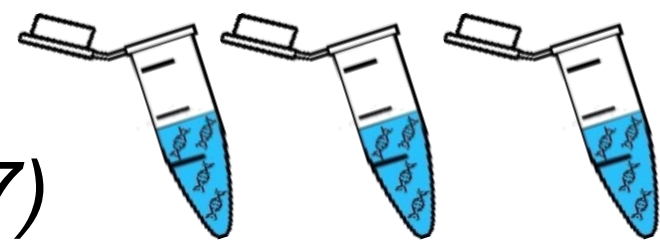
- 1) to **estimate the incidence** of salivary/lachrymal dysfunctions at 6 months after <sup>131</sup>I-therapy,
- 2) to **identify <sup>131</sup>I-therapy related risk factors** for salivary/lachrymal dysfunctions,
- 3) to **assess relationships** between <sup>131</sup>I-therapy radiation dose and these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

**MATERIAL and METHODS**

- **Population** : 139 patients, candidates for a <sup>131</sup>I-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)

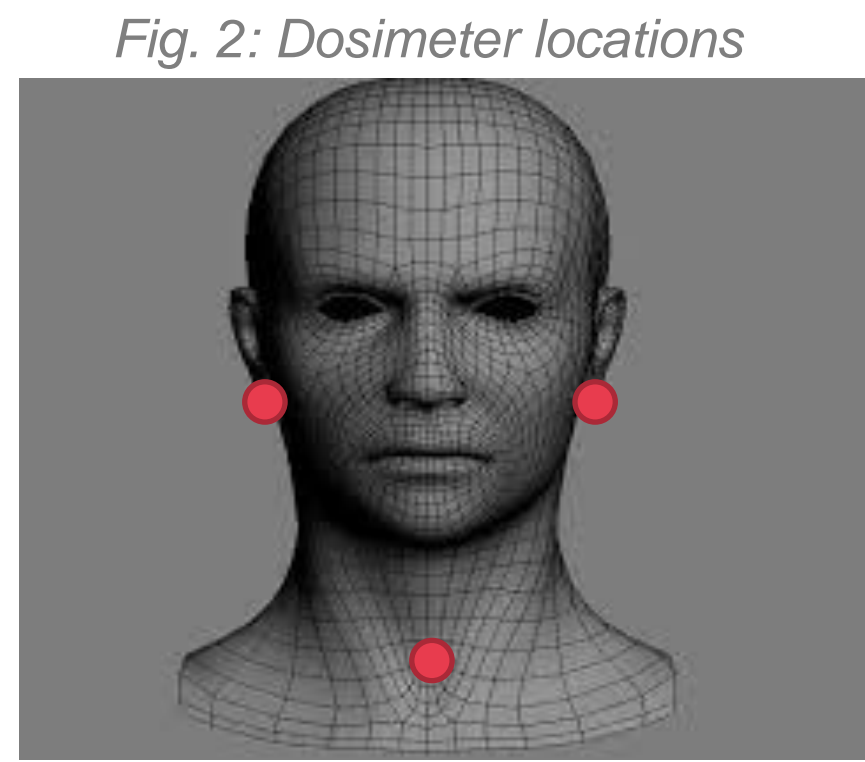
- **Outcomes: salivary and lachrymal dysfunctions**
  - ✓ Saliva samples: volume measurements before and after the stimulation of salivary glands
  - ✓ Salivary dysfunctions question (*E. Moreddu*, 2017)  
“Have you noticed a lack of saliva since the radioiodine therapy?”
  - ✓ Dry eyes (OSDI © questionnaire)

- **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
<b>Gender<sup>a</sup></b>		
	women	97 (71.3)
	men	39 (28.7)
<b>Age at inclusion (years)<sup>b</sup></b>		47.1 (14.1)
<b>Cancer histology<sup>a</sup></b>		
	Follicular	20 (14.7)
	Papillary	116 (85.3)
<b>pTNM staging<sup>a</sup></b>		
	Tx-T2	101 (74.8)
	T3-T4	34 (25.2)
	Nx-N0	76 (55.9)
	N1	60 (44.1)
<b>History of systemic disease<sup>a</sup></b>		
	Yes	40 (29.4)
<b>History of salivary dysfunctions<sup>a</sup></b>		
	Yes	7 (5.1)
<b>HAD score<sup>b</sup> at T0</b>		11.6 (6.4)

<sup>a</sup>N(%); <sup>b</sup>mean(sd)

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 <sup>131</sup>I-exposure and salivary or lachrymal disorders adjusted on the previous variables (Table 2).

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

Variable <sup>a</sup>	Categories	N	Dry mouth sensation		Unstimulated saliva flow (mL/min)		Stimulated saliva flow (mL/min)		K <sup>o</sup> concentration (mmol/L)		OSDI score	
			OR	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI
MD (Gy)	Before treatment	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	
	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)

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

**DISCUSSION**

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

**The results do not show any obvious clinical disorders after the <sup>131</sup>I-therapy.**

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