fraction neoadjuvant radiotherapy is under study. We sought to investigate the rate of pathologic response and postoperative toxicities related to delaying surgery after neoadjuvant radiotherapy.

Methods: Women 65 years of age or older with a new diagnosis of stage I unifocal luminal A breast cancer were eligible for inclusion. A single 20 Gy dose of radiotherapy to the primary breast tumor was given, followed by breast-conserving surgery 3 months later. The primary endpoint was the pathologic response rate assessed by microscopic evaluation using the Miller-Payne system. The secondary endpoint was the incidence of radiation toxicity, graded according to the Common Terminology Criteria for Adverse Events (CTCAE). The toxicity was planned to be assessed at 6 weeks, 4 months, 12 months and yearly for up to 5 years after radiotherapy.

Results: To date, 13 patients have been successfully treated and had completed the 4-month follow-up. Median age of patients was 71 years (range: 65–83 years). Neoadjuvant radiotherapy resulted in a tumour pathologic response in 11 of 13 patients with a median residual cellularity of 1% (range: 0–10%). At the 4 months' toxicity assessment, 10 patients developed grade 1 toxicities (dermatitis, telangiectasia, fibrosis, breast pain, breast swelling and chronic mastitis), and 3 patients developed grade 2 toxicities (dermatitis, fibrosis and skin or wound infection). No grade 3 or higher toxicities were noted.

Conclusion: This study demonstrates that delaying surgery after a single fraction of neoadjuvant radiotherapy can lead to a high level of pathologic response in most patients and is relatively well tolerated with acceptable toxicity. Continued follow up of our patients and subsequent larger trials are needed to better assess the late radiation toxicities as well as the optimal fractionation and timing of this novel technique in the management of early-stage breast cancer.

Trial registry number: NCT03917498

Trial status: Recruiting

Trial sponsor(s): Hôpital Maisonneuve-Rosemont

No conflict of interest.

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Dosimetric impact of an AI-based delineation software satisfying international guidelines in breast cancer radiotherapy

M. Ung[1], S. Rivera[1], A. Rouyar[1], E. Limkin[1], C. Petit[1], T. Sarrade[2], A. Carre[1], G. Auzac[1], A. Lombard[3], E. Ullmann[3], N. Bonnet[4], A. Lamrani-Ghaouti[4], N. Paragios[3], C. Martineau-Huynh[3], E. Deutsch[1], C. Robert[1]. *[1]Institut Gustave Roussy, Radiothérapie, Villejuif, France; [2]Institut Curie, Radiothérapie, Paris, France; [3]Therapanacea, Paris, France; [4]Unicancer, Recherche, Paris, France*

Background: Delineation is time consuming in radiation oncologist's daily life and prone to inter-expert variability. Automatic delineation (AD) allows time saving, practice harmonization and may result in qualitative improvement. The objective of this study was to evaluate, based on a retrospective monocentric cohort of breast cancer patients treated before 2015, the clinical impact of the use of an Artificial Intelligence (AI)-based solution for organs-at-risk (OAR) and target volume delineation, respecting international guidelines.

Material and methods: A CE-marked solution for AD harnessing a unique combination of anatomically preserving and deep learning delineation concept was developed. Using transfer learning, the model was tuned to respect the 2015 ESTRO guidelines, through the integration of 256 cases randomly selected from the HYPOG-01 trial. Forty-four patient cases were retrieved for which 3D-conformal radiotherapy (3D CRT) was prescribed. For each case, AD was generated and minor corrections were applied when necessary. Dosimetric maps used in clinic were then transferred without plan re-optimization on the AD to evaluate the dosimetric relevance of the delivered plans. Dosimetric values were compared using a Wilcoxon test. Qualitative evaluation consisted in scoring each plan as A (Dosimetry accepted), B (Minor correction required) or C (Dosimetry rejected) based on the HYPOG-01 dosimetric constraints.

Results: Dosimetric objectives were met with AD and manual delineations (MD) for all OARs as shown in Table 1 for 50 Gy prescription. The majority (91%) of thoracic wall treatments included axillary and internal mammary nodes (IMN). All of them were scored as "B" or "C" in AD configuration as 3D CRT was responsible for field junction undercoverage. 3/26 cases of 50 + 16 Gy prescription were scored as "C" in AD. These cases included axillary nodes treatment without MD, showing that this region was underdosed in clinical practice.

Table 1. Dosimetric comparison between MD and AD for 50 Gy prescription (mean dose; standard deviation) (n = 11) – ND: Not Done

	Manual Delineation	Auto Delineation	p-Value (Wilcoxon test)
CTV Breast			
D95 (Gy)	38.01 (9.44)	37.62 (12.48)	0.58
D2 (Gy)	54.45 (0.96)	54.70 (1.17)	0.06
Dmean (Gy)	49.16 (2.00)	49.23 (2.22)	0.41
Volume (cm3)	399.49 (195.09)	386.49 (204.51)	0.21
CTV Level 3 (D95, Gy)	ND	41.98 (3.64)	
CTV Level 4 (D95, Gy)	ND	44.02 (2.82)	
CTV IMN (D95, Gy)	ND	18.10 (9.09)	
Ipsilateral lung			
V20 (%)	21.75 (5.18)	17.40 (3.34)	0.10
Dmean (Gy)	11.31 (2.04)	11.67 (2.08)	0.10
Heart			
V20 (%)	2.98 (2.23)	2.78 (1.96)	0.41
V40 (%)	1.27 (1.70)	1.74 (2.23)	1.00
Spinal cord			
Dmax (Gy)	5.96 (6.03)	5.18 (4.23)	0.67

Conclusions: Even if dose plans were performed before ESTRO recommendations, dose constraints were respected for all OARs. Axillary nodes delineation should improve coverage of target volumes and AD could contribute to this coverage improvement.

No conflict of interest.

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Effects of adjuvant breast radiotherapy delivered over one week (+/– sequential hypofractionated tumour bed boost): Prospective observational study confirming acceptable acute skin toxicity

K. Nugent[1], J. Jennifer Trousdell[1], H. O. Driscoll[1], S. Cleary[1], E. Quinlan[1], J. Williams[1], M. Dunne[1], O. McArdle[1], F. Duane[1]. *[1]St Luke's Hospital Network Dublin, Radiation Oncology, Dublin, Ireland*

Purpose: For patients requiring adjuvant breast radiotherapy the landmark FAST-Forward trial has recently shown that delivering 26 Gy in 5 fractions over one week is non-inferior to the moderately hypofractionated schedule 40 Gy in 15 fractions delivered over 3 weeks, both in terms of acute and late toxicity and 5-year local tumour control. This study aims to confirm the pattern of acute skin toxicity resulting from this treatment regimen as well as reporting the acute skin toxicity rates associated with the addition of a sequential boost.

Methods: This multicentre prospective observational study included consecutive patients who attended for adjuvant breast radiotherapy and received 26 Gy in 5 fractions over 1-week (± sequential hypofractionated tumour bed boost) April–July 2020. Acute skin toxicity was recorded during virtual consultations the week of treatment (baseline) and 1, 2, 3, and 4 weeks post-treatment using CTCAE v4.03 scoring criteria. To allow comparison, the primary endpoint was as per the FAST-Forward trial: the proportion of patients with grade $\geqslant$3 toxicity at any time from the start of radiotherapy to 4 weeks after completion of radiotherapy. Toxicity was compared between patients who received a boost and those that did not.

Results: During this period 75 patients underwent the adjuvant breast 26 Gy in 5 fractions over a week radiation regimen. Of these 9 patients (12%) underwent a sequential hypofractionated boost. 66/ 75 (88%) patients completed at least 4 out of 5 acute toxicity assessments. Not one patient (0/ 66) reported moist desquamation not confined to skin folds or minor bleeding (grade 3 toxicity), 19/ 66 (28.8%) reported, brisk erythema, moist desquamation confined to skin folds or breast swelling (grade 2 toxicity) and 14/66 (21.2%%) reported faint erythema or dry desquamation (grade 1 toxicity). The highest frequency of grade $\geqslant$2 toxicity occurred at week 1 (20%) following completion of 26 Gy in 5 fractions but by week 4 this had reduced to 3%. A Fisher's exact test showed no statistically significant difference in grade 2 toxicity between the boost group and those who did not receive a boost ($p = 0.422$).

Conclusion: This study further confirms the safety and tolerability of delivering adjuvant breast radiotherapy 26 Gy in 5 fractions over 1-week in terms of acute skin toxicity, even followed by a sequential hypofractionated boost.

No conflict of interest.