AZIENDA OSPEDALIERO-UNIVERSITARIA
Città della Salute e della Scienza di Torino
SC FORMAZIONE PERMANENTE
E RAPPORTI CON L'UNIVERSITÀ

WORKSHOP

06 GIUGNO 2025

CRPT- PROGRAMMA REGIONALE DI SCREENING
PREVENZIONE SERENA
AGLI ESTREMI DELLO SCREENING MAMMOGRAFICO

Francesca Arcadipane
Città della salute e della scienza
S.S. Radioterapia, Presidio S.G.A.S.

La radioterapia nell'ambito della Chirurgia Senologica Ricostruttiva: il parere del Radioterapista

No conflicts of interest to disclose

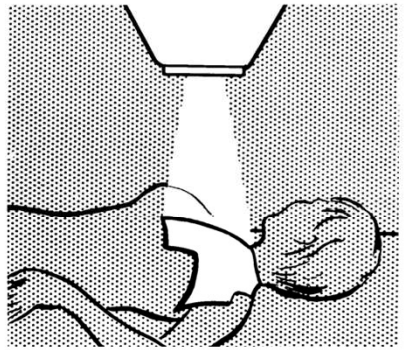
Radiation Therapy

1972, *British Journal of Radiology*, *45*, 745–747 OCTOBER 1972

Electron beam therapy of the post-mastectomy chest wall

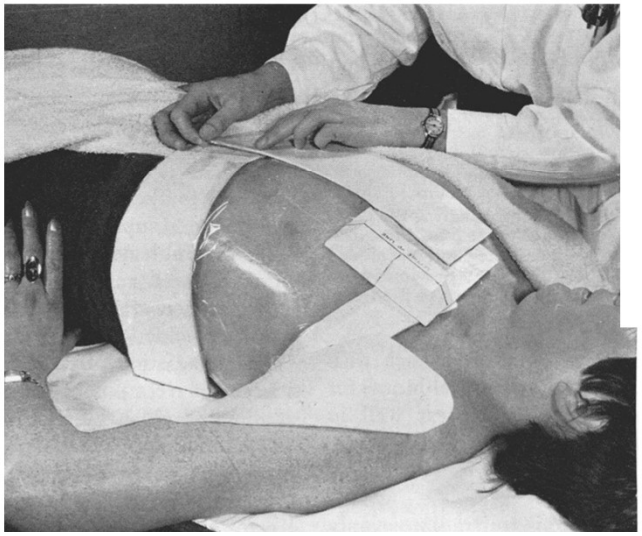
By Stewart M. Jackson, M.D., F.F.R., D.M.R.T., and Robert Gibb, M.B, Ch.B., F.F.R., D.M.R.T.
Christie Hospital and Holt Radium Institute, Manchester M20 9BX

(*Received April, 1972*)



Int. J. Radiation Oncology Biol. Phys., Vol. 15, pp. 627–631
Printed in the U.S.A.

0360-3016/88 $3.00 + .00



● *Original Contribution*

RADIOTHERAPY FOR THE PREVENTION OF LOCAL-REGIONAL RECURRENCE IN HIGH RISK PATIENTS POST MASTECTOMY RECEIVING ADJUVANT CHEMOTHERAPY

BARBARA FOWBLE, M.D.,*† JOHN GLICK, M.D.† AND ROBERT GOODMAN, M.D.*†
University of Pennsylvania School of Medicine, 3400 Spruce St., Philadelphia, PA 19104

RT reduce the incidence of LRR in a high risk group of patients with encouraging survival results with minimal morbidity

PMRT

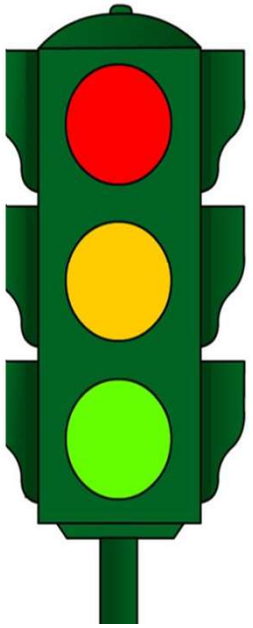
National Comprehensive Cancer Network®

NCCN Guidelines Version 4.2025
Invasive Breast Cancer

NCCN Guidelines Index
Table of Contents
Discussion

LOCOREGIONAL TREATMENT OF cT1–3, cN0 or cN+, M0 DISEASE[a,v]: MASTECTOMY ± PMRT

SURGERY	ADJUVANT SYSTEMIC THERAPY	PATHOLOGIC NODAL STATUS	RT
Nipple-sparing, skin-sparing, or total mastectomy with surgical axillary staging[k,l] (category 1) ± reconstruction[w]	See BINV-4 to determine whether adjuvant systemic therapy is indicated. RT is typically given after systemic therapy. See BINV-I for sequencing of systemic therapy and RT.	Negative axillary nodes and ≤pT2 (≤5 cm) and margins ≥1 mm	→ No RT[y]
		Negative axillary nodes and ≤pT2 (≤5 cm) and negative margins but <1 mm	→ Consider postmastectomy radiotherapy (PMRT)[s] to chest wall. For patients with additional high-risk features,[y] consider addition of comprehensive RNI (including any portion of the undissected axilla at risk).
		Negative axillary nodes and pT3 (>5 cm)	→ Consider PMRT[s] to chest wall ± comprehensive RNI (including any portion of the undissected axilla at risk).
		1–3 positive axillary nodes[x]	→ Strongly consider PMRT[s] to chest wall + comprehensive RNI (including any portion of the undissected axilla at risk).
		≥4 positive axillary nodes[r]	→ PMRT[s] to chest wall + comprehensive RNI (including any portion of the undissected axilla at risk) (category 1).
		Margins positive	→ Re-excision to negative margins is preferred. If not feasible, then strongly consider PMRT[s] to chest wall ± comprehensive RNI (including any portion of the undissected axilla at risk).



- Recommended for advanced or high risk breast cancer
- Improve local control and overall survival
- Target volume: chest wall +/- the regional lymph nodes
- 30-40% of patients had regional lymph node involvement
- 10% of patients had a tumor> 5 cm
- Prognosis is favorable: 5-year breast cancer-specific survival 78%-90%

Indications for PMRT

- ≥ 4 positive nodes, PMRT reduced LR and improved OS
- < 4 positive nodes: rate of LR in 1-3 N+ is low without RT
- ***BUT*** in 1-3 N+ and large tumor size, invasion of the skin/nipple, and close/positive margins, the risk of LRR was higher
- T3N0: LRR 7% mastectomy alone +/- CT
  No improvement in OS with PMRT
- ***BUT*** T3N0 and LVSI, G3, close/positive margins, and premenopausal status, may benefit from PMRT

Neoadjuvant chemotherapy

Recommendations for PMRT are based on the initial clinical stage

BUT an excellent/complete PR to neoadjuvant CT in T and N is associated with a significantly decreased risk of LRR >> benefit from PMRT?

NCCN and professional societies currently state there is not enough evidence to support the omission of PMRT in these patients

Ongoing randomized controlled trial, NSABP B-51 (NCT01872975)

NRG Oncology/NSABP B-51/RTOG 1304

Phase III Trial Evaluating Benefit of Adjuvant Regional Nodal Irradiation in Patients With Early Breast Cancer Converting to Axillary Lymph Node Negativity After Neoadjuvant Chemotherapy

Stratified by type of surgery (mastectomy vs lumpectomy), HR status (+/-), HER2 status (+/-), adjuvant chemotherapy (Y/N), and breast pCR status (Y/N)

Patients with cT1-3N1M0 axillary LN+ by FNA or core needle biopsy; completed ≥8 wk of neo-CT(+anti-HER2 therapy if HER2+) ypN0 by SLNB (**≥2 nodes excised**), ALND, or both after neo- CT mastectomy or BCS (N = 1641)

No regional nodal irradiation (n = 821)
Breast radiation if breast-conserving surgery
No chest wall radiation if mastectomy

Regional nodal irradiation (n = 820)
Breast radiation if breast-conserving surgery
Chest wall radiation if mastectomy

NRG Oncology/NSABP B-51/RTOG 1304

Parameter	No RNI (n = 784)	RNI (n = 772)	HR (95% CI)	*P* Value
IBCRFI events, n	59	50	0.88 (0.60-1.29)	.51
▪ 5-yr estimate of IBCRFI, %	91.8	92.7		
Isolated LRRFI events, %	11*	4†	0.37 (0.12-1.16)	.088
▪ 5-yr estimate of LRRFI, %	98.4	99.3		
DRFI events, n	48	46	1.00 (0.67-1.51)	.99
▪ 5-yr estimate of DRFI, %	93.4	93.4		
DFS events, n	83	85	1.06 (0.79-1.44)	.69
▪ 5-yr estimate of DFS, %	88.5	88.3		
	(n = 802)	(n = 800)	HR (95% CI)	*P* Value
OS events, n	45	49	1.12 (0.75-1.68)	.59
▪ 5-yr estimate of OS, %	94.0	93.6		

*2 local, 8 regional, and 1 locoregional. †All local.

No significant difference for all stratification subgroups or exploratory age, race, and axillary surgery

Slide credit: clinicaloptions.com

Neoadjuvant chemotherapy

NRG Oncology/NSABP B-51/RTOG 1304

- For patients with early cN1 who are ypN0 after neoadjuvant CT, adjuvant regional nodal irradiation is not associated with 5-yr IBCRFI, LRRFI, DRFI, DFS, or OS benefits
- Investigators propose that downstaging axillary nodes with neoadjuvant CT allows for optimization of adjuvant RT without adversely affecting outcomes propose
- Long-term follow-up is ongoing

Neoadjuvant chemotherapy

Review Article

Radiotherapy in breast cancer patients achieving nodal pathologic complete response after neoadjuvant therapy: a scoping review

Axillary pCR (ypN0) obtained after NAC treatment:

- initially cT1- 3 cN1 M0 no benefit is gained from PMRT or RNI
- initially cT4 cN2/3 or residual lymph node disease, PMRT and RNI should be recommended

Highlight box

Key findings

- Most of the studies evaluated in this scoping review failed to show significant benefit from the addition of radiotherapy in ypN0 cases, particularly in cases with clinical criteria similar to those of the NSABP B-51 study, i.e., initially cT1-3 cN1, in which nodal response was achieved following neoadjuvant chemotherapy (NAC).

What is known and what is new?

- Traditionally, regional nodal irradiation (RNI) or postmastectomy radiotherapy (PMRT) for patients receiving NAC was guided by the disease volume at initial diagnosis, without considering the patient's response to the neoadjuvant systemic treatment, but rather relying on data from patients who underwent upfront surgery.
- Currently, there has been much debate on the role of radiotherapy in the presence of complete lymph node response (ypN0) to NAC. This review shows that no benefit is gained from RNI or PMRT in ypN0 cases. Conversely, in cases of initially more advanced clinical staging (cT4 cN2/3) or residual lymph node disease, radiotherapy should be recommended.

What is the implication, and what should change now?

- The possibility of de-escalating radiotherapy as a localized treatment following NAC is supported by these findings. Nevertheless, the gap in information persists, with further data from randomized studies being required.

Complications after PMRT

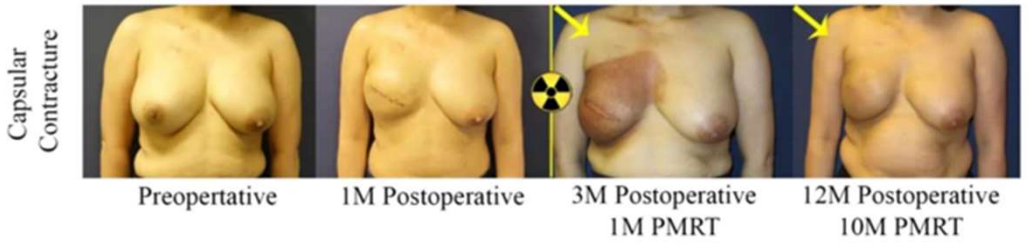
Acute Toxicity (3 months):

- fatigue
- temporary sore throat
- radiation dermatitis: skin erythema, hyperpigmentation, rash, and dryness followed by moist desquamation.

Chronic Toxicity

- hyperpigmentation
- **fibrosis of the chest wall, affecting cosmetic outcomes after reconstruction**
- radiation pneumonitis
- rib fracture
- arm lymphedema
- radiation-induced heart disease
- hypothyroidism
- extremely low risk of secondary cancer

PMRT after implant



PMRT has been associated with:

- increased rates of capsular contracture
- reconstructive failures
- revision surgeries
- overall worse cosmetic outcomes

The timing of the breast reconstruction requires a discussion with the patient and multi-disciplinary team before surgery

PMRT and recostruction

INTERNATIONAL JOURNAL OF
RADIATION ONCOLOGY · BIOLOGY · PHYSICS ASTRO

2723 · Volume 120, Issue 2, Supplement , E330, October 01, 2024

Complications of Post-Mastectomy Radiotherapy in Immediate Two-Stage Implant Reconstruction: Contemporary Outcomes at an Academic Hospital System

M.D. Riina [1] · E. Berlin [1] · N.K. Taunk [1] · S. Azoury [2] · J. Serletti [2] · G.M. Freedman [1]

Major reconstruction complications 19%;
Reconstruction failure 14%

Reconstruction Failure Causes	N (%)
Infection	9 (33%)
Capsular Contracture	7 (26%)
Implant Exposure	5 (19%)
Breast Pain	2 (8%)
Patient Preference	2 (8%)
Radiation Dermatitis	1 (4%)
Multifactorial	1 (4%)

PMRT and **active smoking increase risk**

Implant infection was the most common cause of failure

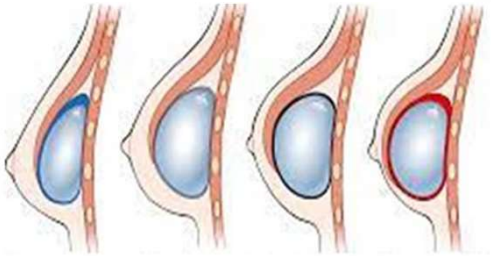
PMRT and recostruction

cancers

MDPI

Article

Incidence and Risk Assessment of Capsular Contracture in Breast Cancer Patients following Post-Mastectomy Radiotherapy and Implant-Based Reconstruction



Baker classification

Immediate breast reconstruction has steadily increased

Recent RT techniques >> reduction of adverse events related to breast reconstruction, capsular contracture (CC) remains the main complication after PMRT

Incidence of clinically relevant CC /Baker III–IV: 22.9% Baker I-IV: 47%

Rate of reconstruction failure/implant loss: 25.4%.

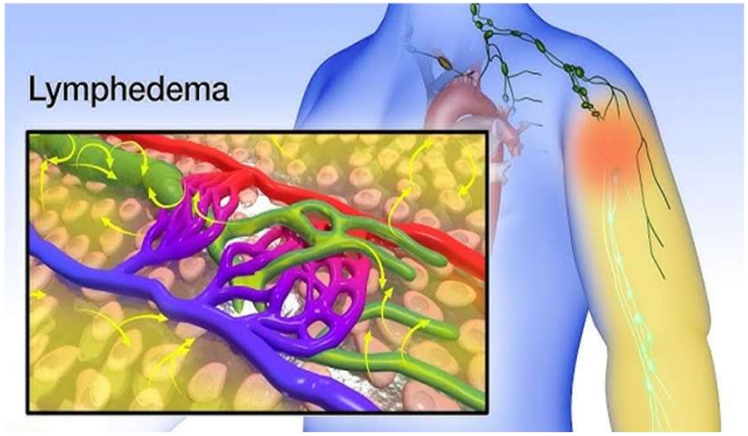
CC rate is related to postoperative complications and N+

No dosimetric factors or the implant position were associated with CC

Vinsensia et al, Jan '24

Complications after PMRT

Lymphedema after axillary RT ranges from 11% to 15% at 1 to 5 years post RT, higher in the setting of prior axillary dissection



Lymphedema education, compression sleeves, compression pumps, regular exercise, and personal preventive measures have been shown to reduce the incidence of breast cancer-related lymphedema

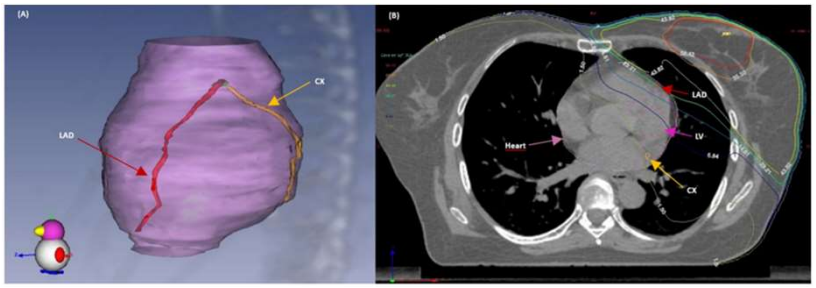
Complications after PMRT

Cardiac disease: Darby et al. demonstrated a linear correlation between Dmean to heart and rate of coronary events: for every 1 Gy increase HEART Dmean the relative rate of coronary events increased by 7.4% up to 20 years after treatment

Review of Taylor et. al 2010-2015: Average heart doses was 4.4 Gy. RT increased risk of cardiac events. **Smoking** can determine the net effect of RT on mortality, but smoking cessation substantially reduces risk.

BACCARAT cohort study 2024 Echocardiography T0, T6, T24 months; 44%patients developed cardiac dysfunction and 7% severe disease

V2 of LV ≥ 36% and mean CX dose ≥ 1.40 Gy thresholds predict cardiac dysfunction



Modern radiation techniques could reduce cancer therapy-related cardiac dysfunction

Radiation Therapy

The Breast 73 (2024) 103673

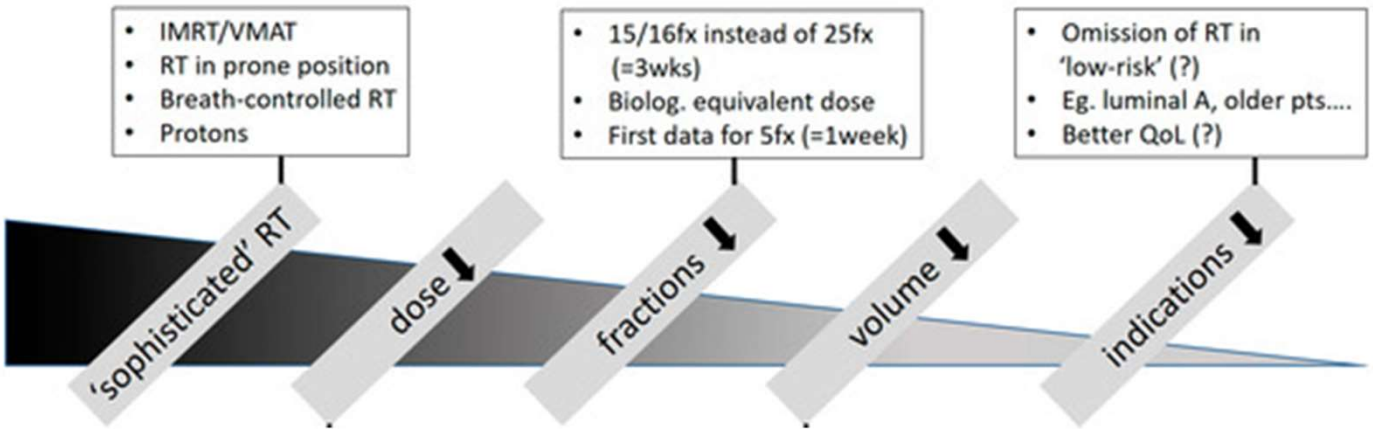
Contents lists available at ScienceDirect

The Breast

journal homepage: www.journals.elsevier.com/the-breast

Editorial

De-escalation of loco-regional treatments: Time to find a balance



- Omission of PMRT
- Selection of patient
- Role of regional nodal RT after less-extensive axillary surgery

Possibilities of De-Escalation

Radiation Therapy

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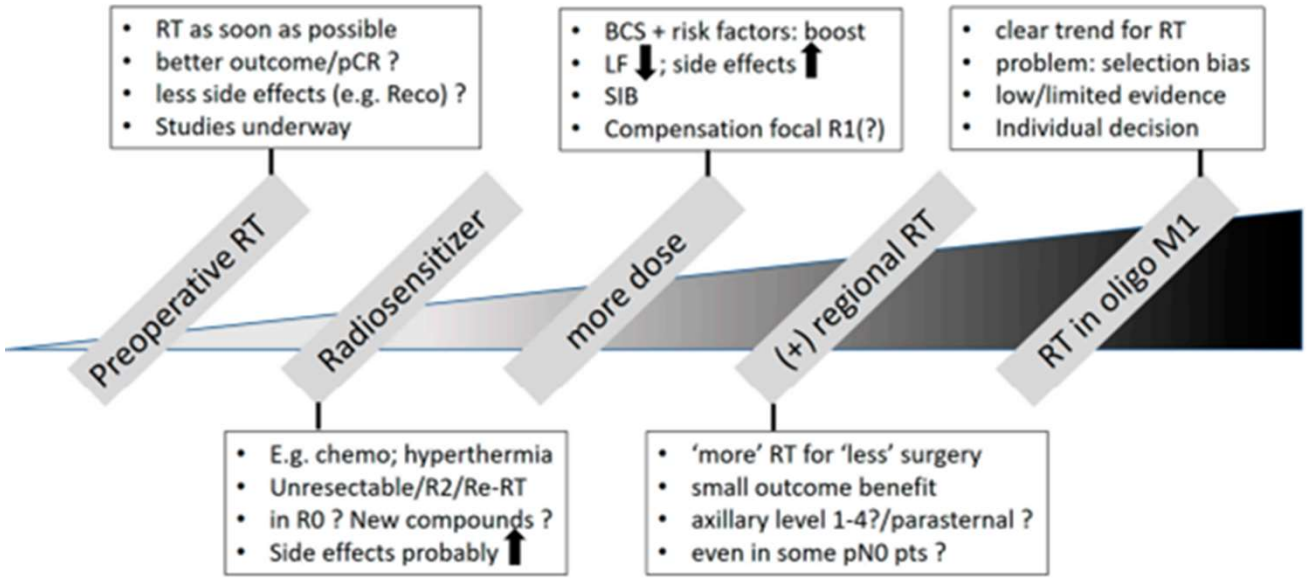


Possibilities of Escalation

Preoperative RT

On going trial:
-fewer side effect after surgery
- better definition of tumor bed
- possibly to achieve higher pCR rates

Dose escalation- BOOST

Age, G3, TNBC, Her2+

Additional Regional RT

It is unclear which lymph node area RT counted most

SBRT in Oligometastatic

Radiation Therapy

INTERNATIONAL JOURNAL OF RADIATION ONCOLOGY • BIOLOGY • PHYSICS ASTRO

1079 · Volume 114, Issue 3, Supplement , S145, November 01, 2022

Comparing Radiotherapy (RT) Late Toxicities to the Reconstructed DIEP Flap in Breast Cancer Patients Treated with Neoadjuvant RT (NART) vs. Post-Mastectomy RT (PMRT)

L. Admojo [1] · P. Chidley [2] · Y.H. Lin [1,3] · F. Foroudi [4] · S. Jassal [1] · S.W. Loh [1] · G. Chew [1] · E. Bevington [1] · S.L. Ng [1] · A. Hyett [1] · T. Leech [1] ·

No difference in LC was reported

Cosmesis 'excellent to good': 96.1% NART vs 80.1% PMRT

Flap contracture: 1.9% NART vs 41.9% PMRT (minimal in 29% and moderate in 12.9%)

Fat necrosis rate: 12.9% NART vs 19.4% PMRT

Late Toxicities	NART (n= 155)	PMRT (n = 31)	p-value
Cosmesis			<0.001
N/A | Poor	0.6 | 0.6	0 | 0	
Fair | Average	1.9 | 0.6	19.4 | 0	
Good | Excellent	12.9 | 83.2	29.0 | 51.6	
Flap Contracture			<0.001
No | Unspecified	96.8 | 1.3	58.1 | 0	
Minimal | Moderate	1.3 | 0.6	29 | 12.9	
Fat Necrosis			<0.001
No	87.1	80.6	
Gr 2 | Gr 4	2.9 | 0	9.7 | 9.7	

PMRT has significantly higher risk of late toxicities compared to NART followed by reconstruction BUT it's a retrospective trial

Radiation Therapy

Ann Surg Oncol (2023) 30:3263–3279
https://doi.org/10.1245/s10434-023-13233-9

Annals of SURGICAL ONCOLOGY
OFFICIAL JOURNAL OF THE SOCIETY OF SURGICAL ONCOLOGY

Check for updates

REVIEW ARTICLE – BREAST ONCOLOGY

Preoperative Partial Breast Irradiation in Patients with Low-Risk Breast Cancer: A Systematic Review of Literature

Yasmin A. Civil, MD[1,2], Lysanne W. Jonker, MD[1], Maartje P. M. Groot Koerkamp, BSc[1], Katya M. Duvivier, MD[3], Ralph de Vries, MSc[4], Arlene L. Oei, PhD[5,6,7,8], Berend J. Slotman, MD, PhD, FASTRO FARS HFACR[1,2], Susanne van der Velde, MD, PhD[9], and H. J. G. Desirée van den Bongard, MD, PhD[1,2,8]

8 prospective and one retrospective cohort study were identified (n = 359)

Low risk patients

pCR: 42% and increased after a longer interval between RT and BCS (0.5–8 months). RESULTS: LR low 0–3% and OS 97–100%

Cosmetic outcome was good to excellent in 78–100% of the patients

Dose and fractionation

Most centres use regimens of either 40 Gy/15 fr or 26 Gy/5 fr

The 2 regimens were comparable: with no clinically important differences all-cause mortality, breast cancer-related mortality or disease recurrence.

26Gy /5 fr: Adverse events was higher and QoL inferior but not significant

Limited evidence comparing the 2 regimens in breast reconstruction or lymph node RT

Potential risks: lymphoedema, CC

For PMRT with reconstruction + lymph node RT: 40Gy/15 fr

NICE National Institute for Health and Care Excellence

NICE guideline

Early and locally advanced breast cancer: diagnosis and management

NICE guideline
Published: 18 July 2018
Last updated: 16 January 2024

Dose and fractionation

Historically doses used for adjuvant irradiation: 45-50 Gy/25-28 fr + Boost

Moderate hypofractionation (e.g. 15-16 fractions of 2.50-2.67 Gy single dose) has shown equivalent effectiveness and comparable side-effects

FAST-Forward trial demonstrated that after 6 years' median FU, same oncological and safety outcomes for breast and chest wall irradiation Outcomes after ultra-hypofractionation for locoregional RT: data from a prospective sub-study are awaited

FAST regimen can be used for frail patients with difficulties of daily transportation

ESMO GOOD SCIENCE BETTER MEDICINE BEST PRACTICE

December 2023

Dose and fractionation

European Society for Radiotherapy and Oncology Advisory Committee in Radiation Oncology Practice consensus recommendations on patient selection and dose and fractionation for external beam radiotherapy in early breast cancer

- Moderate hypofractionation can be offered for chest wall and nodal RT regardless of time and type of breast reconstruction
- Ultrahypofractionation for chest wall irradiation without breast reconstruction can be offered
- Ultrahypofractionation for chest wall after breast reconstruction and nodal RT should not be offered until ongoing trials results are reported

***Panel:* Final consensus statements**

1. Whole breast irradiation

a Moderate hypofractionated whole breast irradiation should be offered regardless of age at breast cancer diagnosis, pathological tumour stage, breast cancer biology, surgical margins status, tumour bed boost, breast size, invasive or pre-invasive ductal carcinoma in situ (DCIS) disease, oncoplastic breast conserving surgery, and use of systemic therapy

b Ultrahypofractionated (26 Gy in five fractions) whole breast irradiation can be offered as (1) standard of care or (2) within a randomised controlled trial or prospective registration cohort

2. Chest wall irradiation

a Moderate hypofractionation can be offered for chest wall irradiation without breast reconstruction

b Moderate hypofractionation can be offered for chest wall irradiation regardless of time and type of breast reconstruction

c Ultrahypofractionation (26 Gy in five fractions) for chest wall irradiation without breast reconstruction can be offered as (1) standard of care or (2) within a randomised controlled trial or prospective registration cohort

d Ultrahypofractionation (26 Gy in five fractions) for chest wall irradiation after breast reconstruction can be offered within a randomised controlled trial or prospective

3. Nodal irradiation

a Moderate hypofractionation should be offered for nodal irradiation

b Ultrahypofractionation (26 Gy in five fractions) should not be offered for nodal irradiation until ongoing trials results are reported

4. Partial breast irradiation–patient selection for external beam radiotherapy

Low risk-features suitable for partial breast irradiation are: luminal-like subtypes small tumour (≤3 cm), absence of lymph vascular space invasion, non-lobular invasive carcinoma, tumour grade 1–2, low-to-intermediate grade DCIS (sized ≤2·5 cm with clear surgical margins ≥3 mm), age at diagnosis 50 years or more, unicentric or unifocal lesion, clear surgical margins (>2 mm), node negative (including isolated tumour cells), and no use of primary systemic therapy and neoadjuvant chemotherapy

5. Partial breast irradiation–dose and fractionation

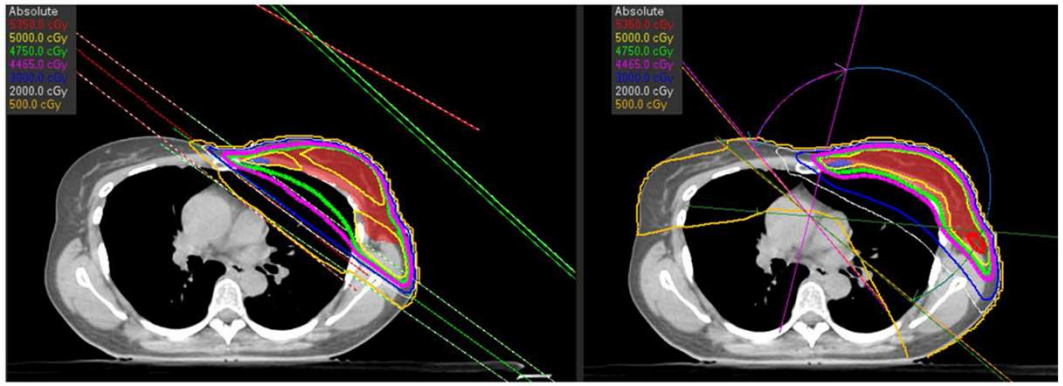
a Moderate hypofractionation (40 Gy in 15 fractions) and ultrahypofractionation (26–30 Gy in five fractions) represent acceptable schedules for external beam partial breast irradiation

b Twice a day external beam partial breast irradiation dose and fractionations similar to those used in the RAPID trial should not be offered

ESTRO

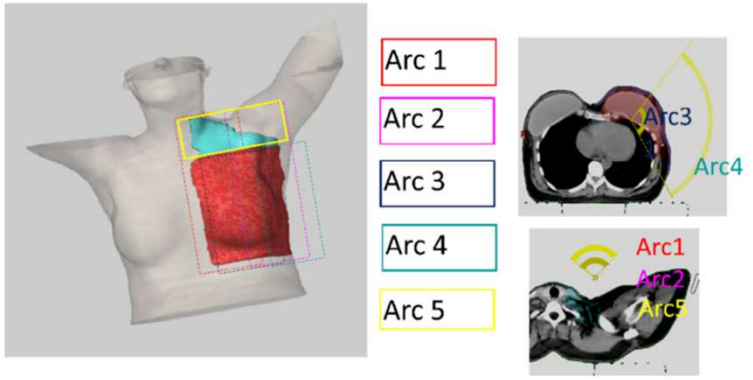
Meattini et al, Lancet 2022

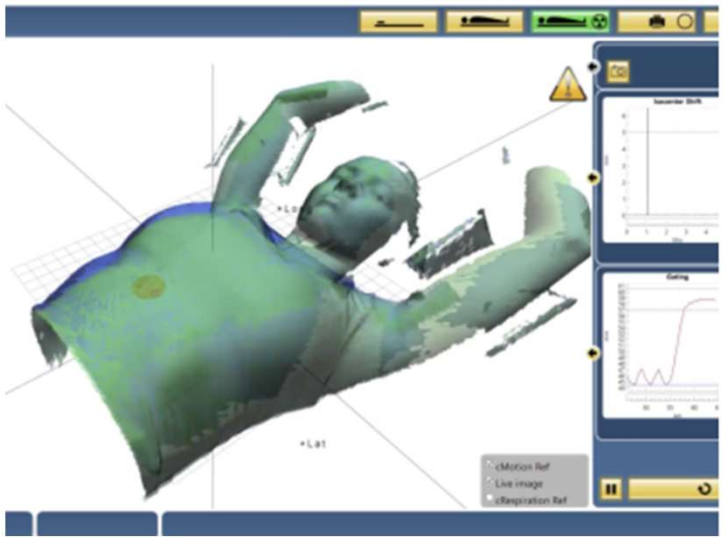
RT innovations



3DCRT

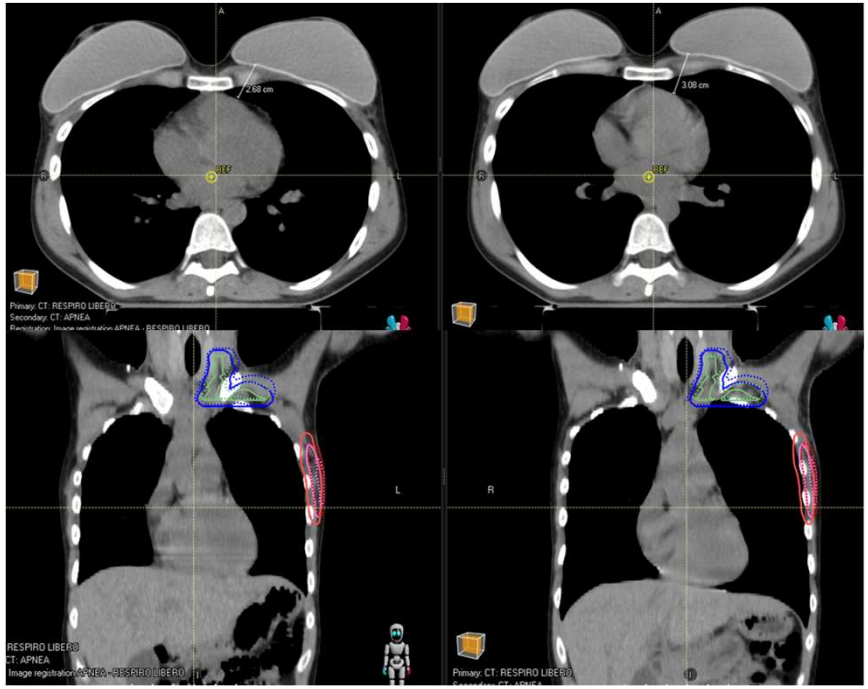
VMAT

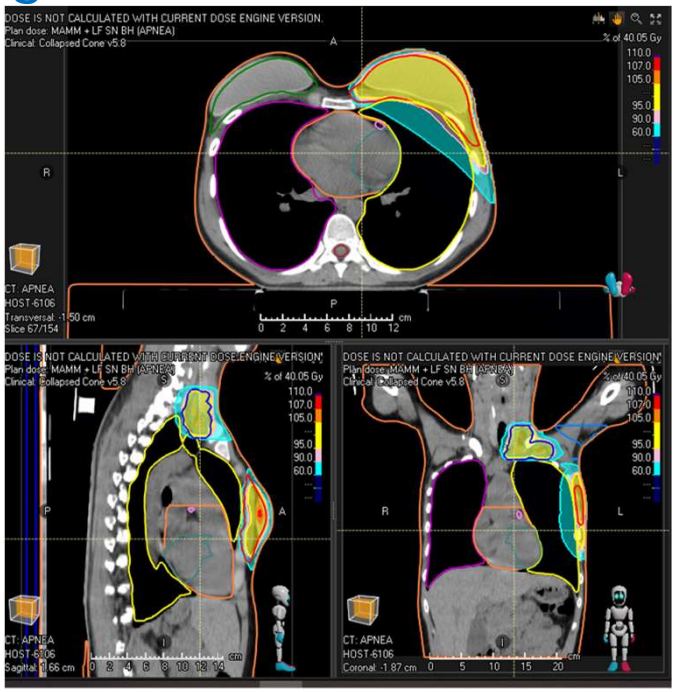




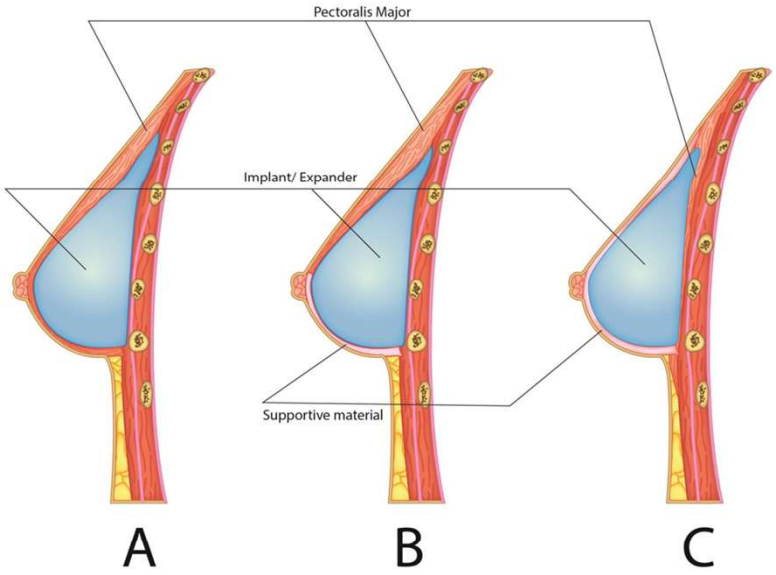
RT innovations

Left-sided breast cancer: **DIBH** can often increase the distance between the heart and chest wall, thus lowering the cardiac dose.

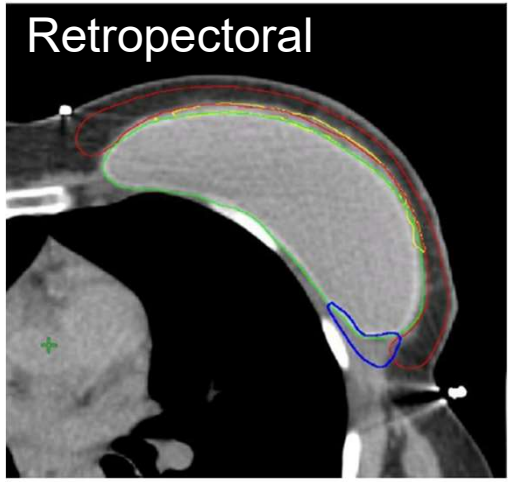


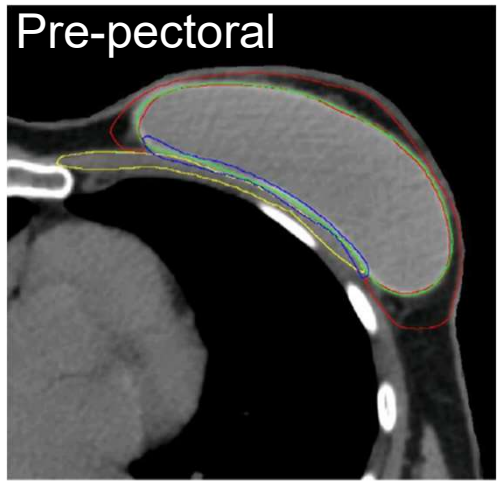


RT: volume and planning



(A) retropectoral
(B) retro-pectoral with partial coverage by the pectoral muscle and supportive material in the lower part
(C) pre-pectoral



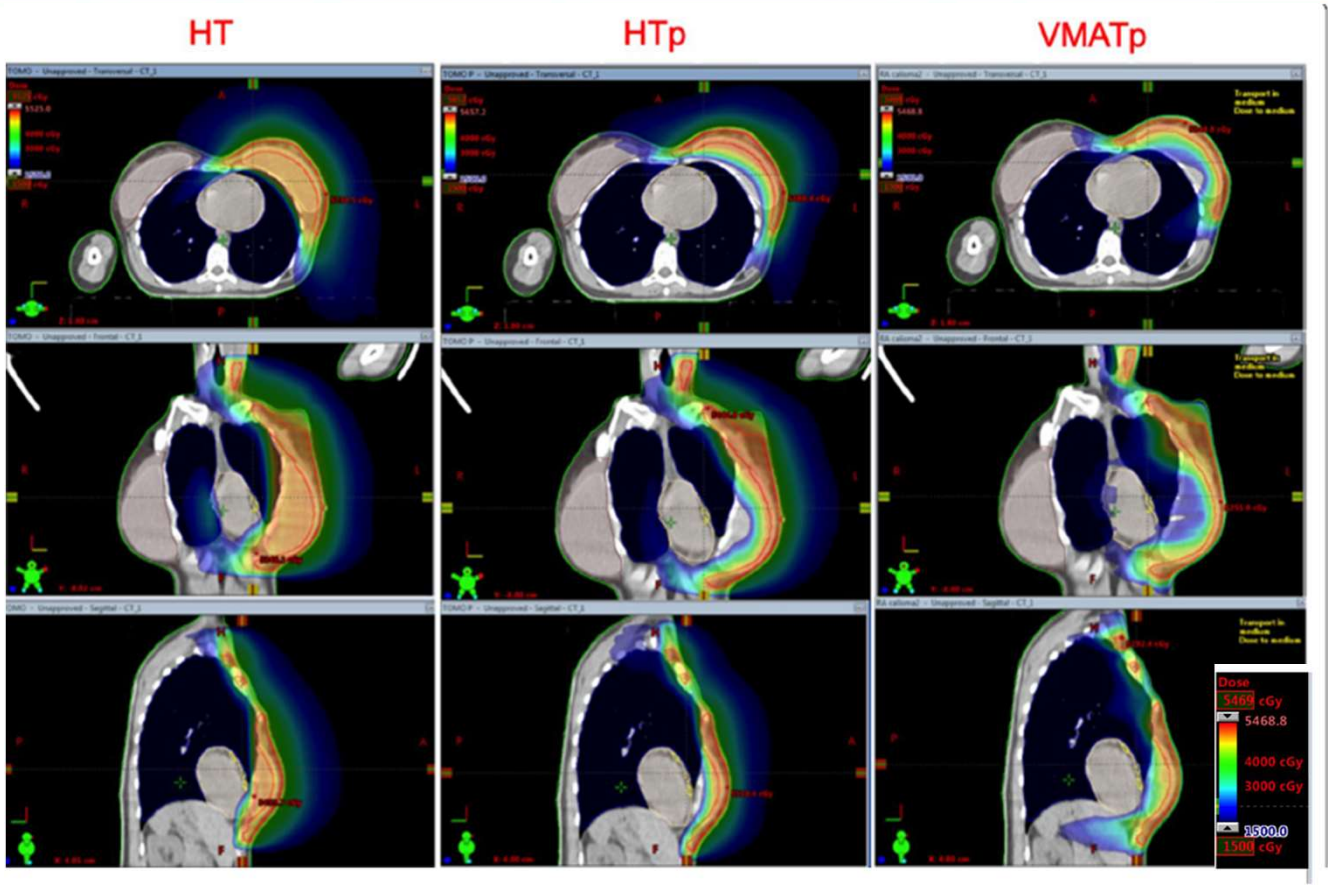


Volumes to be delineated
CTV= red+blue
Transplanted tissues (skin; fat;muscle) and synthetic materials (implant, tissue expander) are not part of CTV

They could be contoured as OaR without compromise CTV coverage

RT: volume and planning

- No difference between HTp and VMATp plans
- Neither HTp nor VMATp could reduce maximum and mean dose to heart
- Both techniques succeeded in reducing the mean dose to implant

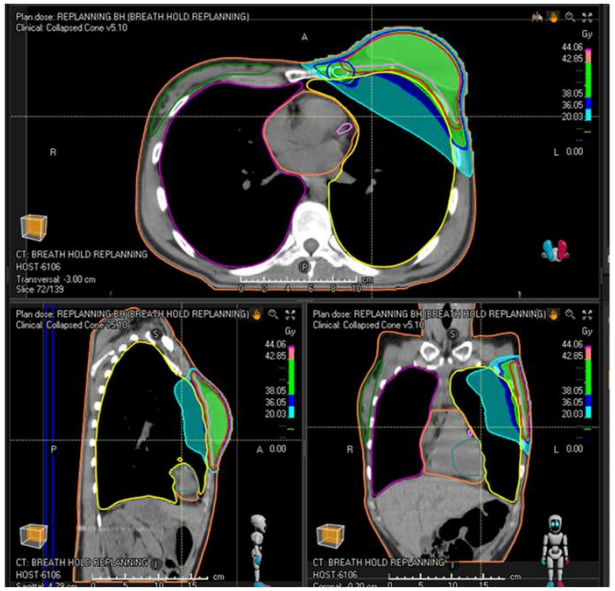


Dosimetric evaluation of VMAT and HT techniques comparing conventional volumes with CTV based on new ESTRO ACROP post-mastectomy with immediate implant reconstruction contouring guidelines EO Göksel et al 2022

Internal mammary node

If **IMNs are involved** (on CT and PET):
inclusion in radiation field
Risk of IMN recurrence is low BUT inclusion of the IMN chain comes at the expense of increased doses to the heart and lungs
Dutch study: 2.5% improvement in cancer-specific survival IMN-RT
French randomized trial: failed to show a survival benefit

EORTC 22922: IMN in central/medially tumors, or N+>> 3% improvement in DFS and a 2% reduction in breast cancer mortality, BUT only 25% mastectomy



Elective IMN coverage remains controversial

Boost and oncoplastic

Journal of Medical Radiation Sciences
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ORIGINAL ARTICLE

A clip-based protocol for breast boost radiotherapy provides clear target visualisation and demonstrates significant volume reduction over time

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CTV for early stage breast cancer is difficult to clearly identify on planning CT scans

Surgical clips inserted around the tumour bed should help to identify the CTV, particularly if the seroma has been reabsorbed, and enable tracking of CTV changes over time

Surgical clips enable localisation of the post-surgical seroma for RT targeting. Most seroma shrinkage occurs early.

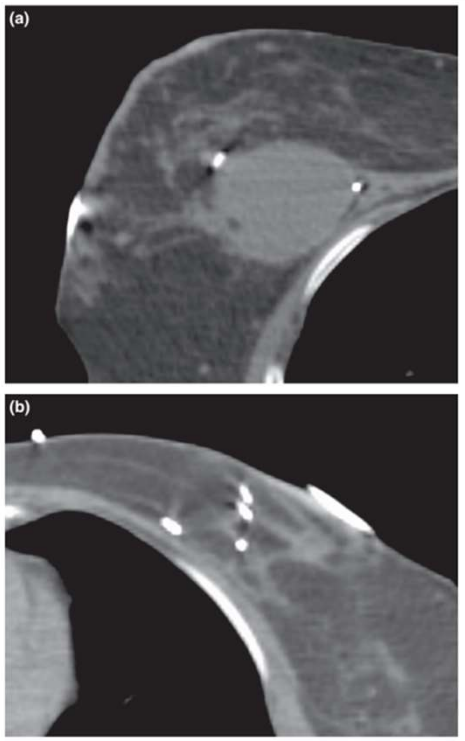


Figure 1. Examples of seroma and clip visualisation. (A) Seroma score = 5 easily identifiable, homogenous with sharp boundaries, clips not necessary. (B) Seroma score = 1 scar/shadow, clips necessary.

Boost and oncoplastic

CURRENT ONCOLOGY
A Canadian Cancer Research Journal

PRACTICE GUIDELINE

Consensus statement on tumour bed localization for radiation after oncoplastic breast surgery

T. Tse MD MSc,*[a] S. Knowles MD MSc,[†a] J. Bélec PhD,[‡] J.M. Caudrelier MD PhD,[‡] M. Lock MD,[§] M. Brackstone MD PhD,[†] and A. Arnaout MD MSc*

- **Surgical clips are necessary** and should, at a minimum, be placed along the 4 side walls of the cavity, plus 1–4 clips at the posterior margin if necessary

- Surgeons and radiation oncologists should have a basic understanding of ops techniques and work on “speaking a common language”

- Careful consideration is needed when determining the value of targeted radiation, such as boost, in higher-level procedures with extensive tissue rearrangement

Boost and oncoplastic

Clinical domain	Recommendation	Level of evidence	Agreement [% (*n* of 15)]
Intraoperative clip placement			
1	In breast-conserving surgery, surgical clips should be placed intraoperatively to assist in tumour bed delineation and postoperative radiation planning.	3	100 (15)
2	The optimal number of surgical clips to be placed is at least 4, with 1 clip placed on each of the cavity side walls (medial, lateral, superior, inferior) at the level where the tumour was originally situated. Additionally, 1–4 clips can be placed on the posterior margin, which might or might not be the chest wall.	3	93.3 (14)
3	Surgeons should avoid the use of clips anywhere else in the breast or axilla except for the purposes of tumour bed delineation. If clips are necessary beyond those required for tumour bed delineation, then the surgeon should clearly document, within the operative report, where and why the clips were used.	4	80 (12)
Speaking the same language: the surgical oncologist and the radiation oncologist			
4	Operative reports should ideally include the tumour size and location, defect size, an accurate description of the surgical procedure (including oncoplastic procedure level, incision, tissue that has been rotated), explanation of clip placement (including how each margin is marked and whether clips were used for other reasons), and closure technique (that is, deep tissue, superficial tissue, or both).	4	93.3 (14)
5	Breast surgeons, radiation oncologists, and radiation technologists should have a basic knowledge of the various oncologic and oncoplastic techniques commonly performed by the surgeons at their institution. Radiation oncologists and surgeons should attempt to establish "a common language" for their local institution.	4	100 (15)
Issues with oncoplastic surgery and targeted radiation techniques			
6	Given the extensive rearrangements of breast tissue with level II and III oncoplastic procedures, the resultant difficulty in tumour bed delineation, and the large volume that might be included in a boost, the radiation oncologist might have to carefully consider the value of boost and the eligibility of such patients for partial breast irradiation.	3	100 (15)

Consensus statement on tumour bed localization for radiation after oncoplastic breast surgery

Boost and oncoplastic

ORIGINAL ARTICLE

Comparison of Tumor Bed Delineation Using a Novel Radiopaque Filament Marker Versus Surgical Clips for Targeting Breast Cancer Radiotherapy

Utkarsh Shukla, MD,†‡ Ulrich W. Langner, PhD,†‡ David Linshaw, MD,§‖*

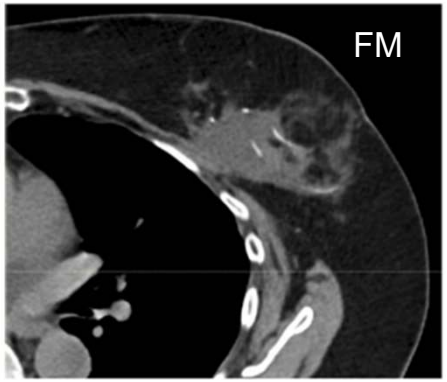
Accuracy of tumor bed (TB) delineation is essential for targeting boost doses or PBI

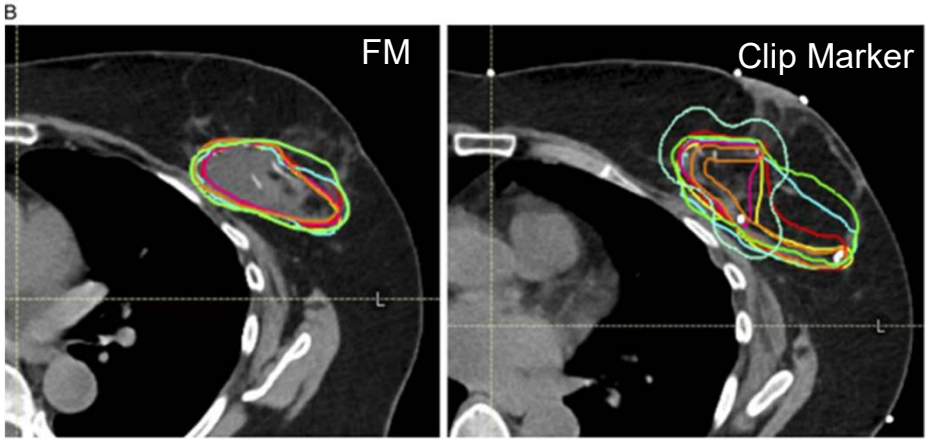
Use of a radiopaque filament marker (FM) woven along the TB

Lumpectomy with oncoplastic surgery:

- difference of average **volume**: 21% FM and 52.2% Clips
- average **dice coefficient** was 0.53 FM versus 0.39 (SD ± 0.24) for Clips

FM consistently outperformed clips in the setting of both BCS and complex oncoplastic reconstruction





Take home message

- PMRT reduces risk of LRR in selected patients
- Hypofractionation is safe and effective after reconstruction and nodal RT
- Ultra-hypofractionation need long-term follow-up
- DIBH reduces dose to heart and lung and adverse events
- Exclusion of implant in CTV could reduce dose to implant, heart and lung and could limite toxicity and improve QoL
- Preoperative RT could open up promising opportunities
- **Multidisciplinary cooperation is essential**
- **STOP SMOKING**

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PREVENZIONE SERENA

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WORKSHOP: AGLI ESTREMI DELLO SCREENING MAMMOGRAFICO

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