BREAST CANCER ACADEMY

Adjuvant radiotherapy for women with newly diagnosed , non-metastatic breast cancer

AN UPDATE ON RADIOTHERAPY

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March 6 -7 2020

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Declaration of conflict of interest

I have no commercial disclosure

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The golden standard after BCS –
Whole Breast Radiotherapy (WBRT)

- Eradication of any tumour deposits remaining following BCS
- Reducing risk of local/ locoregional recurrence
  (reduction of the 10-year risk of any recurrence 35% vs 19 %)*
- Improving breast cancer-specific and overall survival
  (reduction of the 15-year risk of BCD 25 vs 21 %)*
- After neoadjuvant therapy, regardless of the pathological response
- Hypofractionated RT (15-16 fx) °
- RT boost for further reduction of IBTR

* EBCTCG, Darby et al. Lancet 2011;378:1707
° FAST Trialists group;Radiother Oncol 2011;100:99

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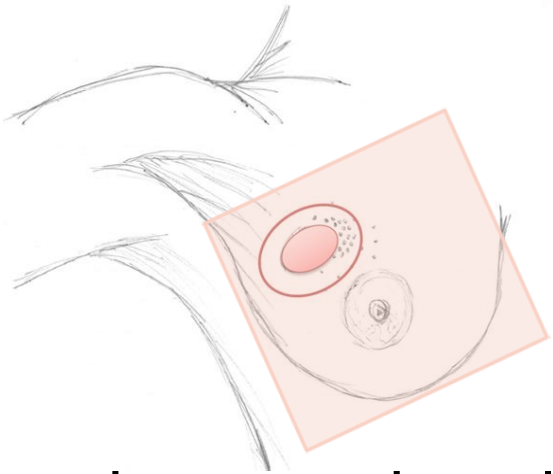
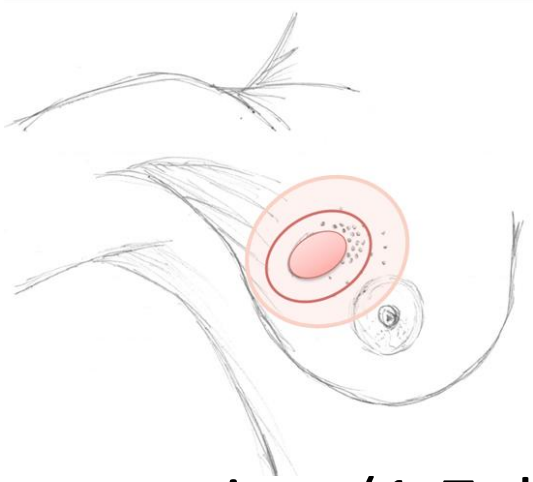
(A)PBI - Accelerated Partial Breast Irradiation

- High dose of RT to a limited volume of tissue, encompassing the lumpectomy bed





- Higher dose per day, shorter treatment time (1-7 days)
- Patient selection criteria (women with low risk disease):
  - ≥ 50 years
  - Small tumours (≤ 2 cm)
  - Negative SNL/LN
  - Negative surgical margins

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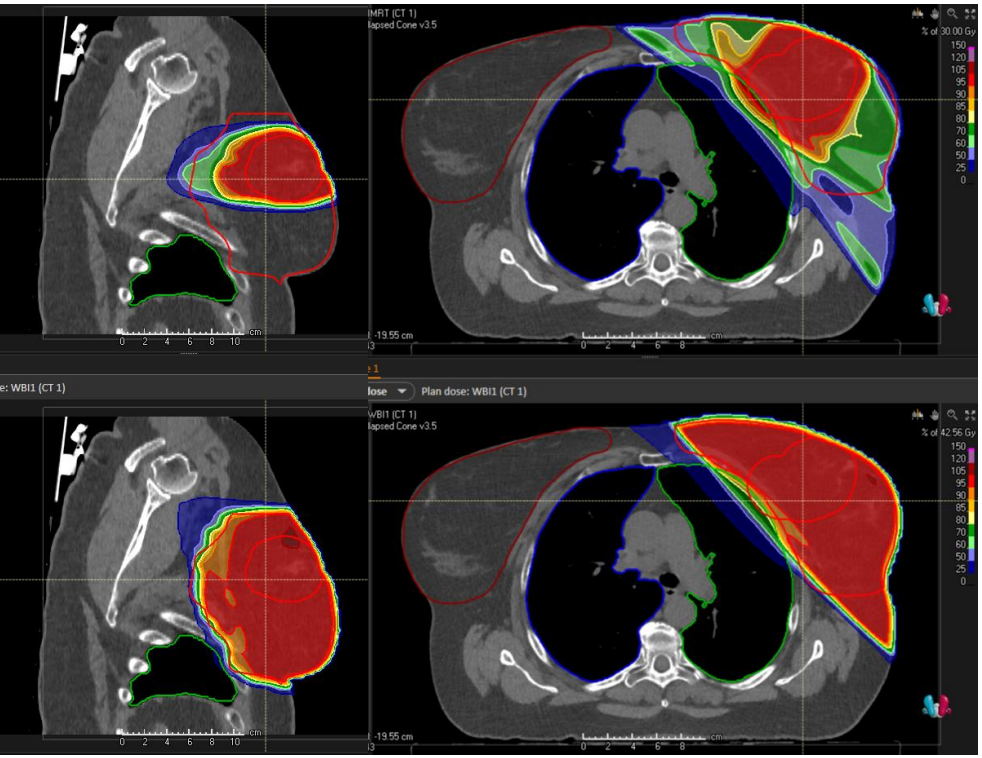
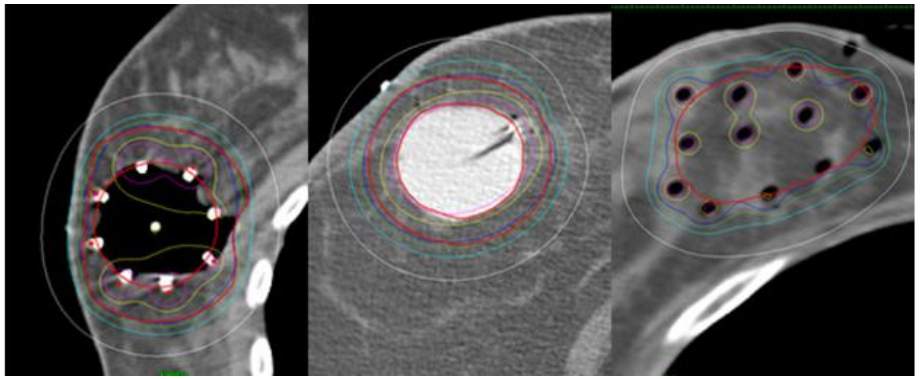
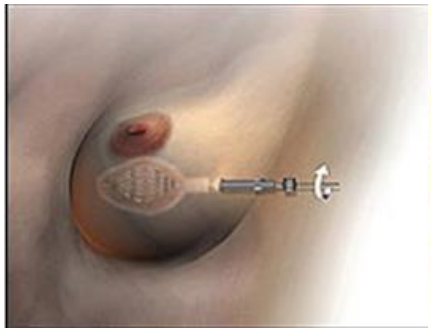
Different Techniques of APBI

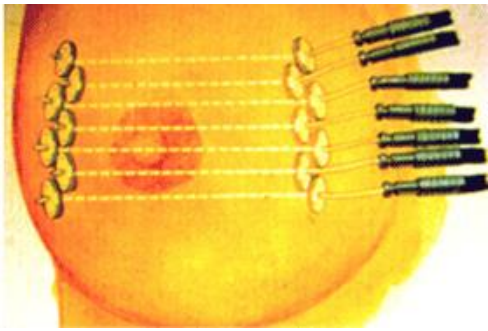
External RT



Intracavitary/ interstitial BT







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Is the time ready for APBI?

GEC- ESTRO Trial[1]

FLORENCE Trial[2]

IMPORT LOW Trial[3]

→ non inferiority RR, similar OS

NSABP-B39[4] → APBI did not meet the criteria for equivalence, BUT an absolute difference of less than 1% in the 10-year cumulative incidence of IBTR

RAPID Trial[5] → cosmesis and side effects increased

↓

YES,
after adequate selection

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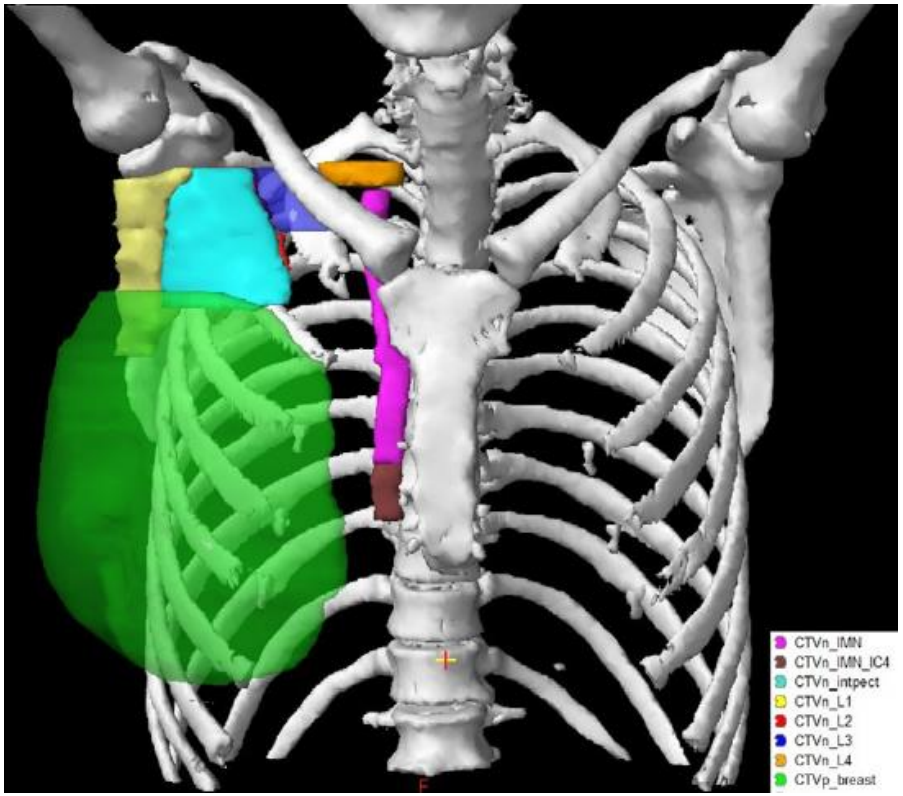
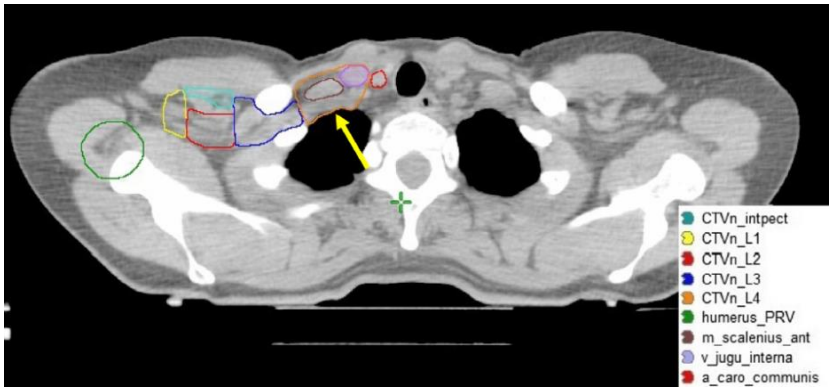
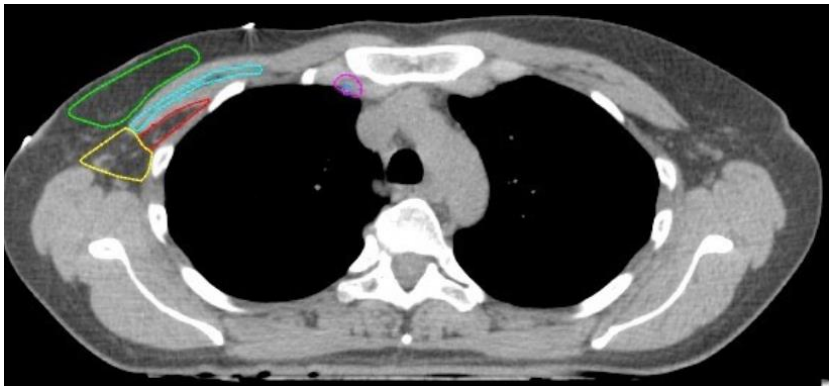
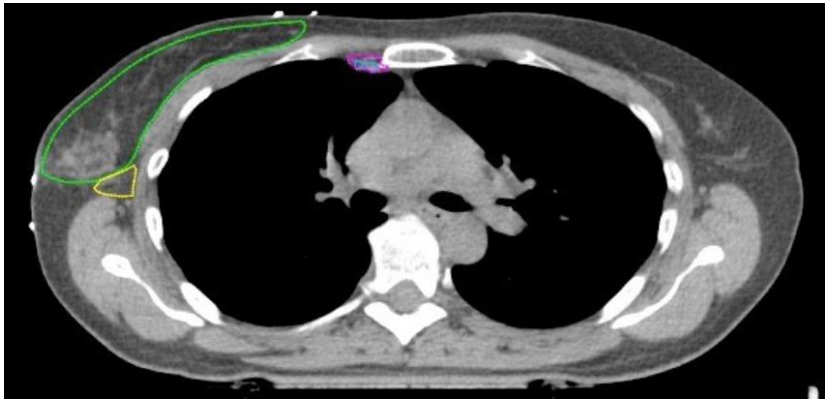
Strnad et al. Lancet. 2016 [1]
Becherini et al.Tumori. 2019 [2]
Coles CE et al. Lancet. 2017 [3]
Vicini FA Lancet. 2019 [4]
Olivotto IA et al. J Clin Oncol. 2013 [5]

Regional Lymphnodes
from a Radiation Oncologist´s View









CTVn_L1
CTVn_L2 ⇨ Axillary LN

CTVn_intpec ⇨ interpectoral LN

CTVn_L3
CTVn_L4 ⇨ Infra/supraclaviculary LN

Regional Node Irradiation (RNI)

after BCS +/- ALND

1. BCS + pN+ (≥4)	Supra/Infraclavicular LN
no ALND/ext. LN-Involvement	+ Axillary LN

2. BCS + pN+(1-3) — Supra/Infraclavicular LN

   + „risk factors“ — (+ Axillary LN)

- Age
- TNBC
- no pCR
- KI-67 > 30%
- G3
- L1
- Medial/Central Tumor

NCIC-CTG MA.20 Trial
EORTC 22922/10925 Trial
EBCTCG meta-analysis SABCS 2018

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Regional Node Irradiation (RNI)

after Mastectomy +/- ALND

High risk of locoregional recurrence

PMRT

- ***T4***
- ***T3pN0*** + risk factors (G3, L1, premeno. (Age < 50 a)
- ***≥ 4 LN***
- ***R1/R2*** situation

Intermediate risk of locoregional recurrence

PMRT
has to
be discussed

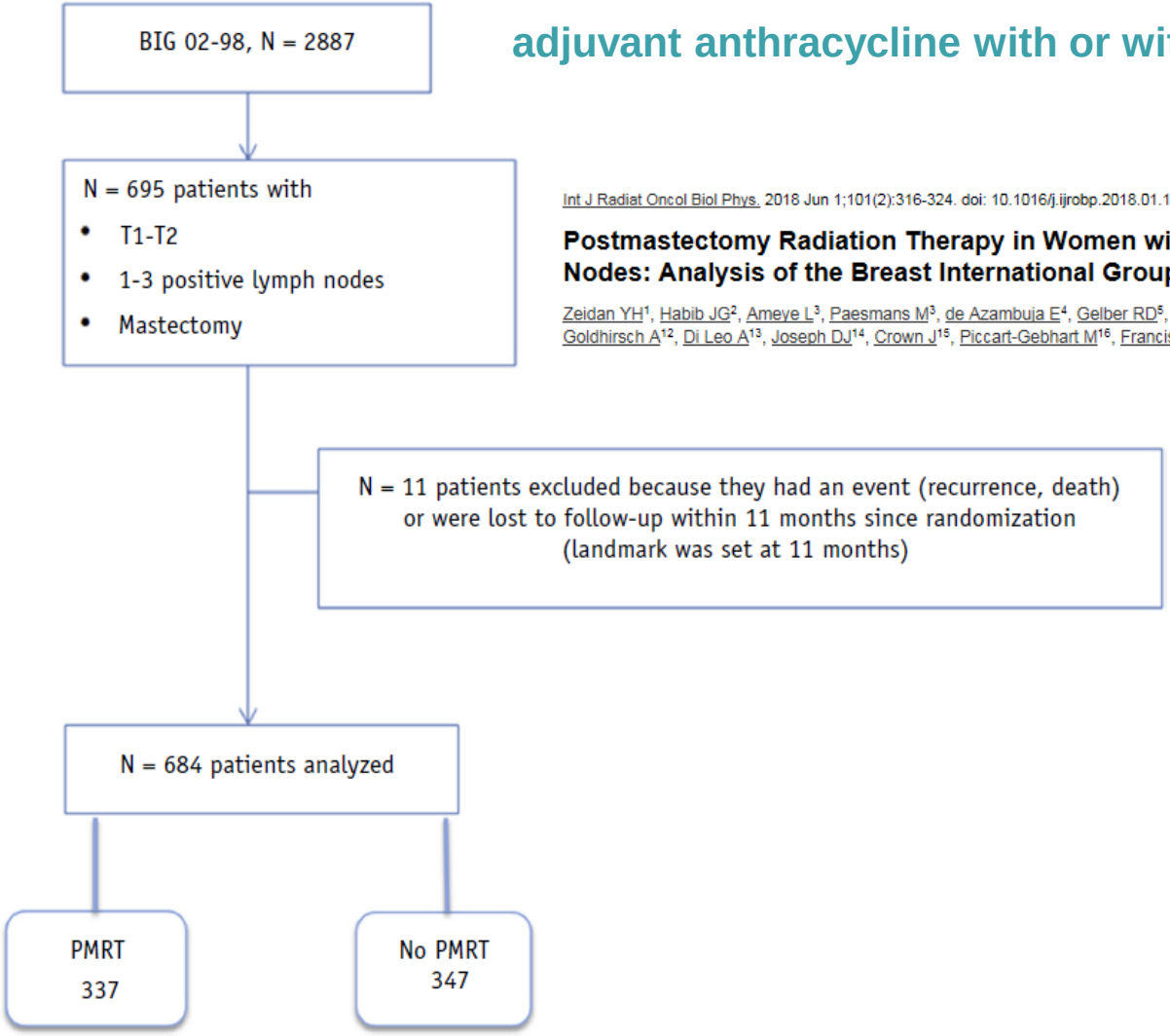
- ***pT1-2pN1 (1-3 LN)*** + risk factors
  - G3
  - L1/V1
  - Ki-67>30%
  - Her2/triple negative
  - < 45a and medial tumour

Low risk of locoregional recurrence

no
PMRT

After immediate breast reconstruction PMRT indications should remain the same as without immediate breast reconstruction

T1-T2 and 1 – 3 positive LN?
In the area of new systemic therapies



adjuvant anthracycline with or without taxane chemotherapy

Int J Radiat Oncol Biol Phys. 2018 Jun 1;101(2):316-324. doi: 10.1016/j.ijrobp.2018.01.105. Epub 2018 Feb 6.

Postmastectomy Radiation Therapy in Women with T1-T2 Tumors and 1 to 3 Positive Lymph Nodes: Analysis of the Breast International Group 02-98 Trial.

Zeidan YH[1], Habib JG[2], Ameye L[3], Paesmans M[3], de Azambuja E[4], Gelber RD[5], Campbell I[6], Nordenskjöld B[7], Gutiérez J[8], Anderson M[9], Lluch A[10], Gnant M[11], Goldhirsch A[12], Di Leo A[13], Joseph DJ[14], Crown J[15], Piccart-Gebhart M[16], Francis PA[17].

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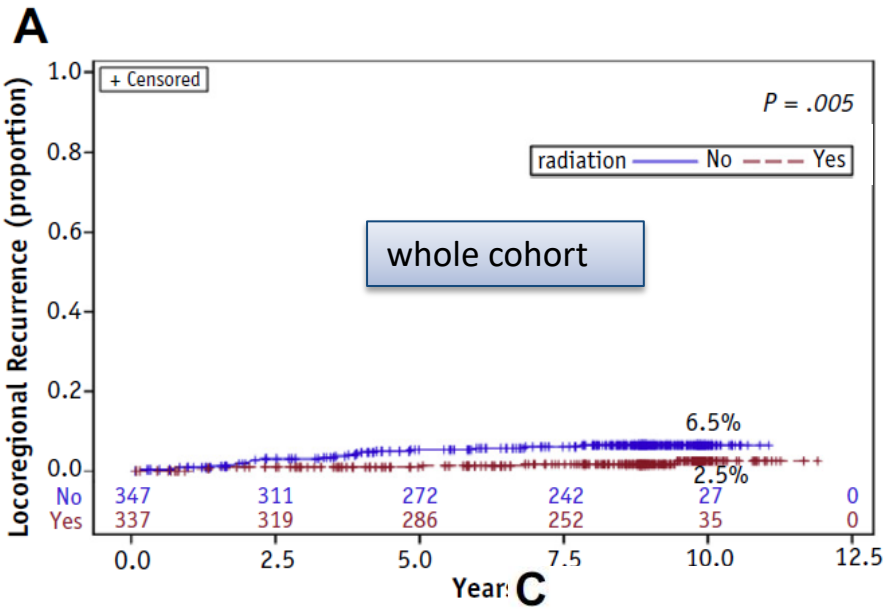
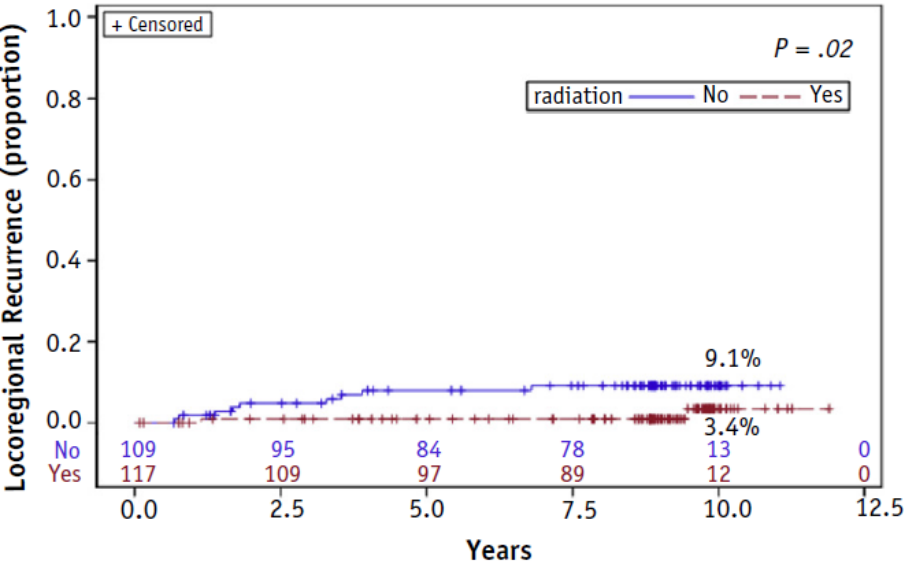
Locoregional Recurrences

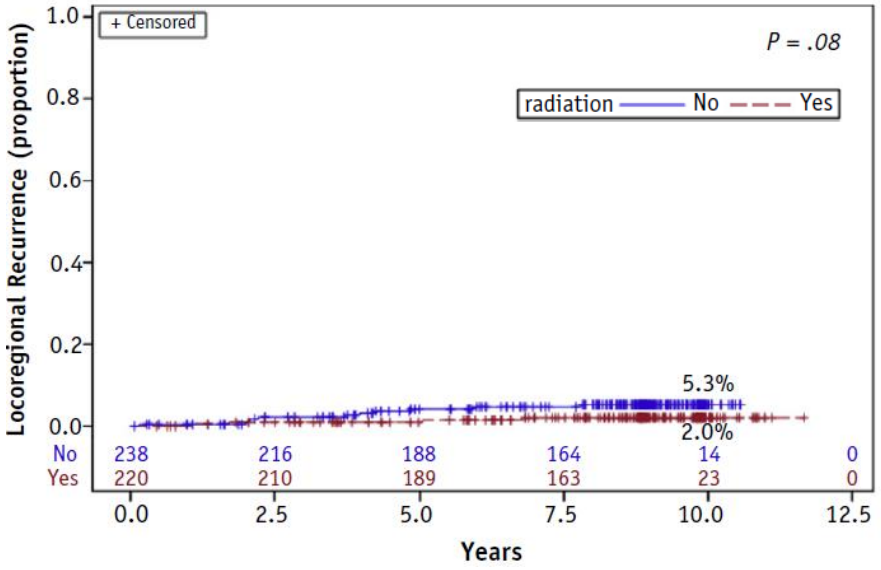


no taxane group

whole cohort

taxane group





What to do after Neoadjuvant Therapy ?

The Management of post-NAC RT is very heterogeneous

Boersma LJ Radiother Oncol. 2020
Gregucci F Radiol Med. 2020 Feb

pre NACT	Post Surgery	WBRT after BCS	PMRT	RNI
local advanced	pCR / no pCR	yes	yes	yes
cT1/2 cN1+	ypT1+ o. ypN1+ (no pCR)	yes	yes	yes
cT1/2 cN1+	ypT0/is ypN0	yes	Risk Factors	Risk Factors
cT1/2 cN0 (US obligatory)	ypT0/is ypN0	yes	no	no

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Mamounas, E.P., et al J Clin Oncol, 2012
Kantor, O., et al., J Surg Oncol, 2017
Rusthoven, C.G., et al. Ann Oncol, 2016

Axillary Management in cT1-2cN0 with 1-2 pos. SNL after BS without ALND

Trial	Study period	Primary country of recruitment	No. of sites	No. of randomly assigned participants	Trial design	Inclusion criteria			Intervention	Comparator	Primary outcome
						Tumor size	Surgery type	SNs			
ACOSOG Z0011	1999–2004	USA	115	891	NI	≤ 5 cm	BCS	Micro- or macrometastases. ≥ 3 positive SNs, matted nodes, or extranodal disease excluded	Observation	cALND	OS
AATRM	2001–2008	Spain	18	247	Superiority	≤ 3.5 cm	BCS or mastectomy	Micrometastases[1]	Observation	cALND	DFS
IBCSG 23-01	2001–2010	Italy	27	934	NI	≤ 5 cm[2]	BCS or mastectomy	Micrometastases[2]	Observation	cALND	DFS
AMAROS	2001–2010	Netherlands	34	4806	NI	≤ 5 cm[3]	BCS or mastectomy	Micro- and macrometastases[3]	ART	cALND	Axillary recurrence
OTOASOR	2002–2009	Hungary	1	2106	NI	≤ 3 cm	BCS or mastectomy	Micro- and macrometastases	ART	cALND	DFS

SN sentinel node, *NI* noninferiority, *BCS* breast-conserving surgery, *cALND* completion axillary lymph node dissection, *ART* axillary radiotherapy, *OS* overall survival, *DFS* disease-free survival

[1]Prior to 2002, isolated tumor cells were considered micrometastases

[2]Prior to 2006, tumor size was limited to ≤ 3 cm and only one positive SN was allowed

[3]Prior to 2008, tumor size was limited to ≤ 3 cm and isolated tumor cells were included

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Axillary Management in cT1-2cN0 with 1-2 pos. SNL

1. No significant decrease in OS, DFS, or axillary recurrence rates could be demonstrated in women with micrometastases managed with observation alone (no cALND, no Axilla-RT).

2. Women with clinically node-negative breast cancer and metastatic SNs (<3) can largely be managed without cALND

3. Axillary radiotherapy is not inferior to axillary lymph node dissections in terms of locoregional control

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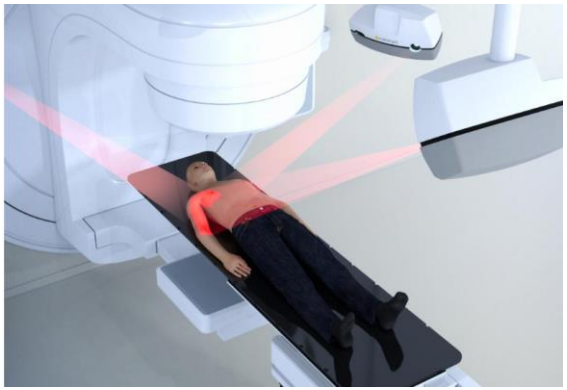
Surface guided radiotherapy with surface tracking systems



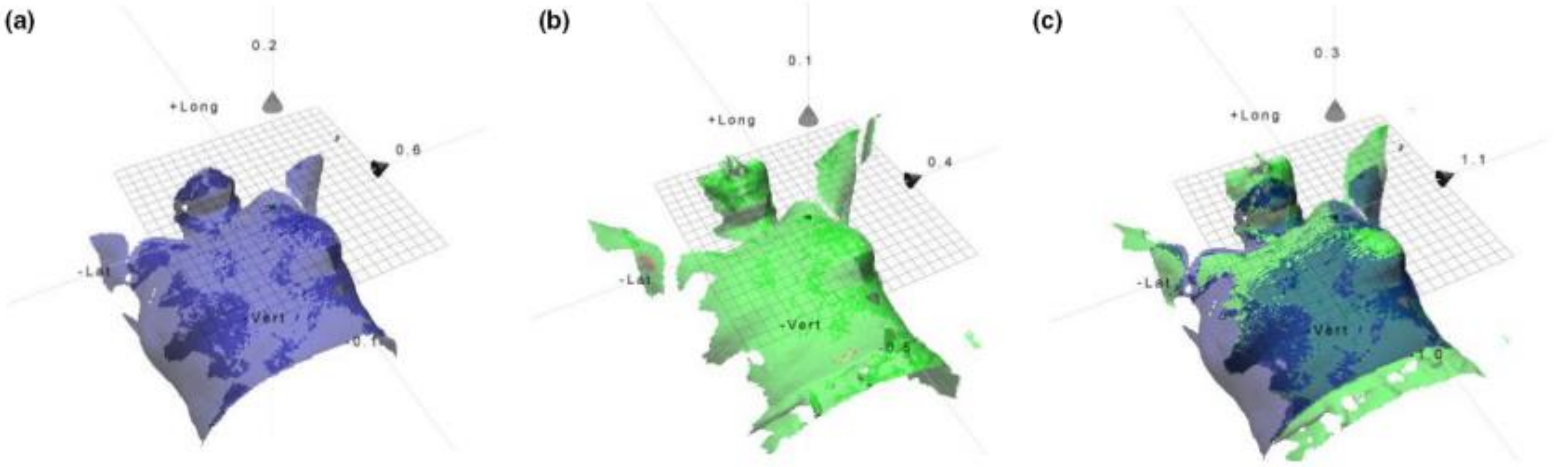
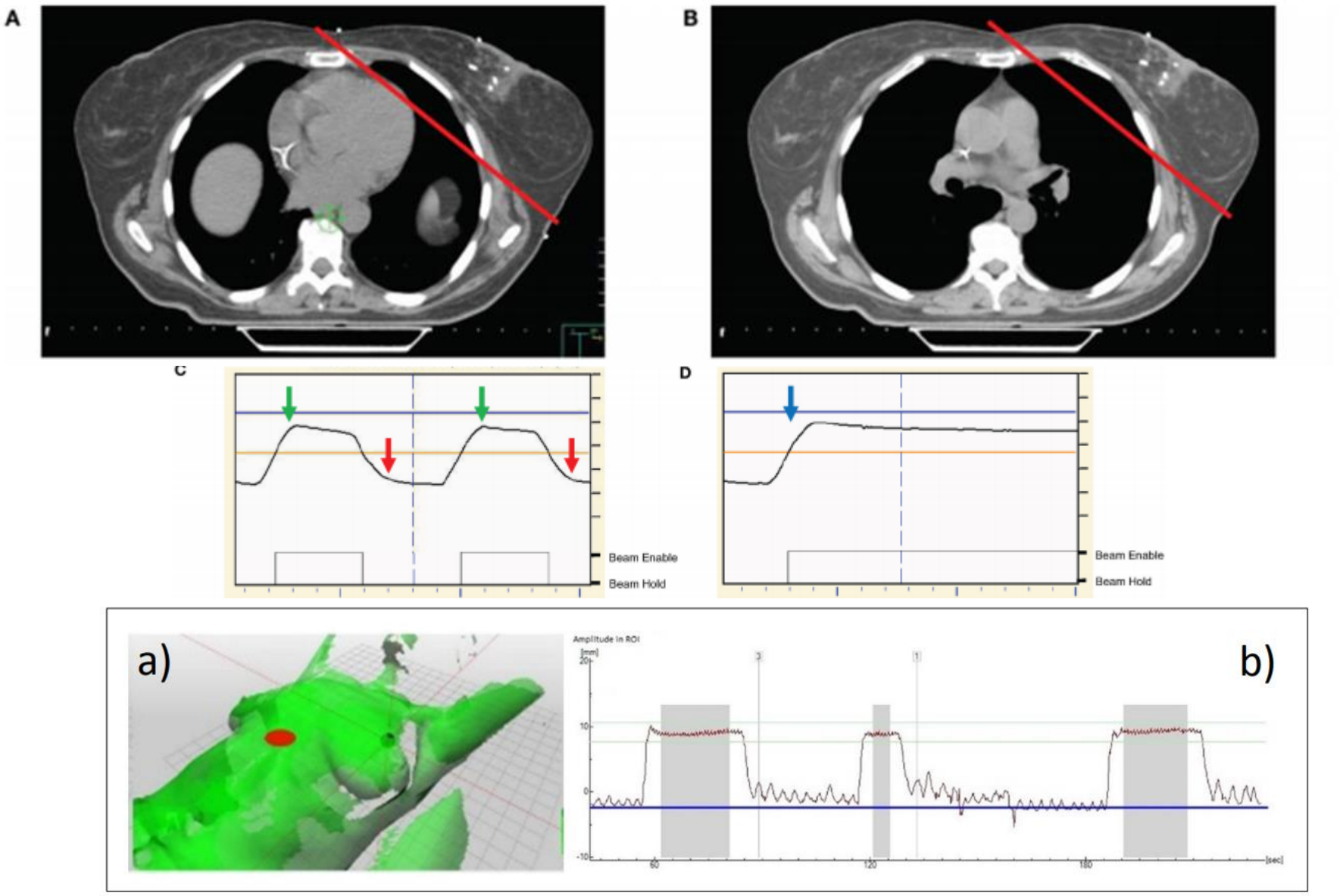


Fig. 1. (a) Reference surface (blue color) with the planned isocenter from the treatment planning system. (b) The live patient surface (green color) captured by a single camera Catalyst™ system. (c) The reference and live surface are matched with a deformable algorithm and a couch shift in 6° of freedom is calculated to shift the live surface into the correct position with respect to the isocenter.

Kügele et al. J Appl Clin Med Phys 2019; 20:9: 61–68

Deep-Inspiration-Breath-Hold-Technique



Kügele et al. J Appl Clin Med Phys. 2019 Sep;20(9):61-68.

Thank you very much for your attention !