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RADIOTERAPIA DELLE STAZIONI LINFONODALI: QUALI,QUANDO E COME.....

DAVIDE BOSETTI

PRINCIPLES OF RADIATION THERAPY

Whole Breast Radiation:
Target definition includes the majority of the breast tissue, and is best done by both clinical assessment and CT-based treatment planning. A uniform dose distribution and minimal normal tissue toxicity are the goals and can be accomplished using compensators such as wedges, forward planning using segments, intensity-modulated radiation therapy (IMRT), respiratory gating, or prone positioning. The breast should receive a dose of 45-50 Gy in 1.8-2 Gy per fraction, or 42.5 Gy at 2.66 Gy per fraction. A boost to the tumor bed is recommended in patie
grade disease). This can be a
beam or photon fields. Typica
schedules are given 5 days p

Chest Wall Radiation (includir
The target includes the ipsilat
drain sites where possible. D
been reconstructed or not, se
electrons are appropriate. CT-
encouraged in order to identif
exposure of these organs. Sp
the use of bolus material whe
skin dose is adequate.

Regional Nodal Radiation:
Target delineation is best ach
planning. For the paraclavicul
depth varies based on the size of the patient. For internal mammary node identification, the internal mammary artery and vein location can be used as a surrogate for the nodal locations, which usually are not visible on imaging. Dose is 50-50.4 Gy, given as 1.8-2.0 Gy fraction size (± scar boost at 2 Gy per fraction to a total dose of approximately 60 Gy); all dose schedules are given 5 days per week. If internal mammary lymph nodes are clinically or pathologically positive, radiation therapy should be given to the internal mammary nodes.

Regional Nodal Radiation:
Target delineation is best achieved by the use of CT-based treatment planning. For the paraclavicular and axillary nodes, prescription depth varies based on the size of the patient. For internal mammary node identification, the internal mammary artery and vein location can be used as a surrogate for the nodal locations, which usually are not visible on imaging. Dose is 50-50.4 Gy, given as 1.8-2.0 Gy fraction size (± scar boost at 2 Gy per fraction to a total dose of approximately 60 Gy); all dose schedules are given 5 days per week. If internal mammary lymph nodes are clinically or pathologically positive, radiation therapy should be given to the internal mammary nodes.

Otherwise the treatment to the internal mammary nodes is at the discretion of the treating radiation oncologist. CT treatment planning should be utilized in all cases where radiation therapy is delivered to the internal mammary lymph node field.

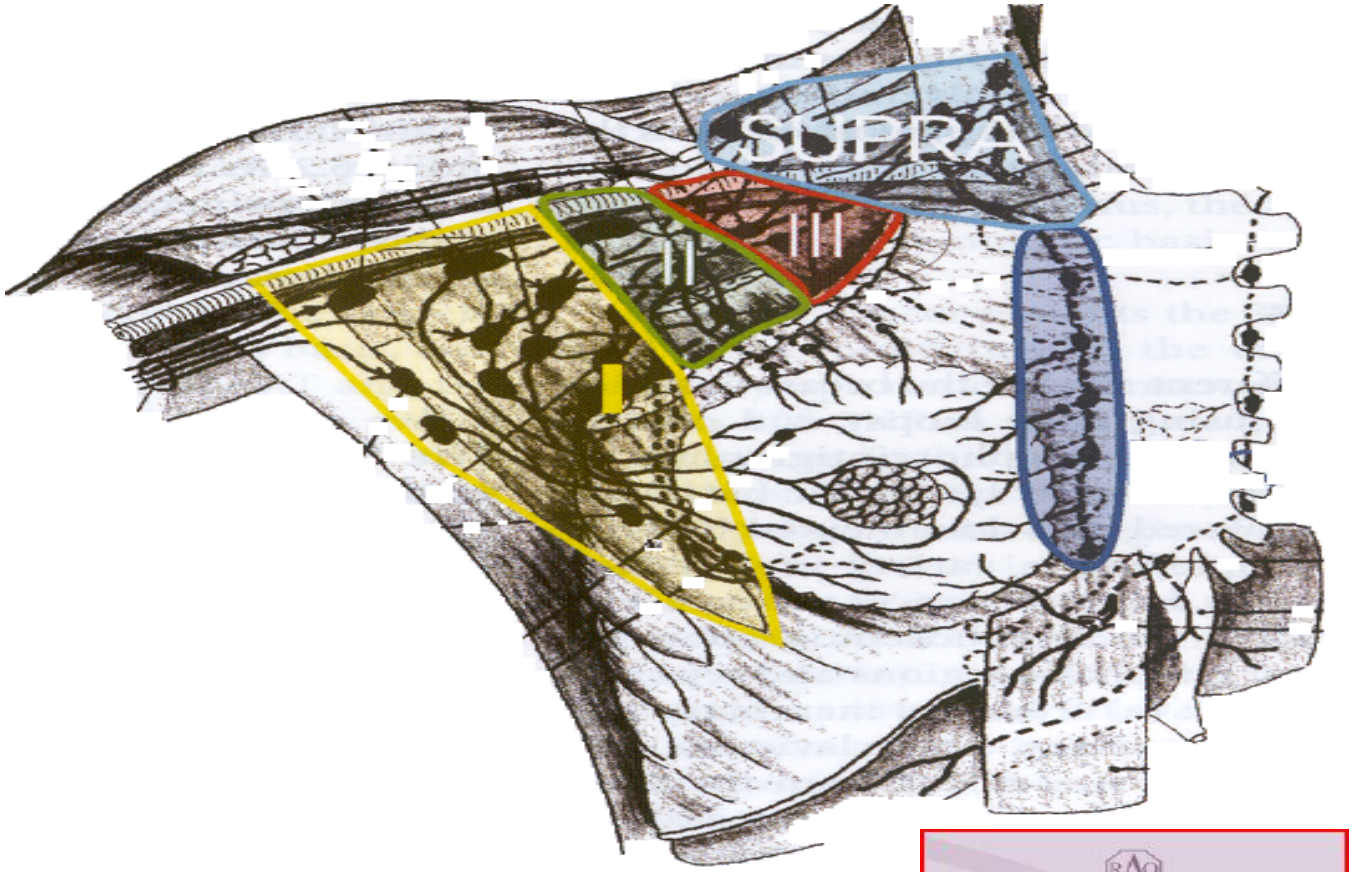
Accelerated Partial Breast Irradiation (APBI):
Preliminary studies of APBI suggest that rates of local control in selected patients with early-stage breast cancer may be comparable
RT. However, compared
ecent studies document
low-up is limited and
d to participate in clinical
statement from the
STRO), patients who may
er who are not carriers of
gery for a unifocal T1N0
ltrating ductal or a
with EIC or LCIS, and
n 10 fractions delivered
in 10 fractions delivered
rapy is prescribed to the
currently under

Optimizing Delivery of Individual Therapy:
It is important to individualize delivery of radiation therapy and considerations such as patient positioning (ie, prone vs. supine) during administration of radiation therapy.

Neoadjuvant Chemotherapy:
Indications for radiation therapy and fields of treatment should be based on the worst stage pretreatment or post-treatment tumor characteristics in patients treated with neoadjuvant chemotherapy.

RADIOTERAPIA DELLE STAZIONI LINFONODALI

- **QUALI**
- **QUANDO**
- **COME**



Breast Cancer Atlas for Radiation Therapy Planning: Consensus Definitions

RTOG
RADIATION THERAPY ONCOLOGY GROUP

Regional Nodal Contours: Anatomical Boundaries

	Cranial	*Caudal*	*Anterior*	*Posterior*	*Lateral*	*Medial*
Supra-clavicular	Caudal to the cricoid cartilage	Junction of brachioceph.-axillary vns./ caudal edge clavicle head [a]	Sternocleido mastoid (SCM) muscle (m.)	Anterior aspect of the scalene m.	Cranial: lateral edge of SCM m. Caudal: junction 1st rib-clavicle	Excludes thyroid and trachea
Axilla-Level I	Axillary vessels cross lateral edge of Pec. Minor m.	Pectoralis (Pec.) major muscle insert into ribs [b]	Plane defined by: anterior surface of Pec. Maj. m. and Lat. Dorsi m.	Anterior surface of subscapularis m.	Medial border of lat. dorsi m.	Lateral border of Pec. minor m.
Axilla-level II	Axillary vessels cross medial edge of Pec. Minor m.	Axillary vessels cross lateral edge of Pec. Minor m. [c]	Anterior surface Pec. Minor m.	Ribs and intercostal muscles	Lateral border of Pec. Minor m.	Medial border of Pec. Minor m.
Axilla-level III	Pec. Minor m. insert on cricoid	Axillary vessels cross medial edge of Pec. Minor m. [d]	Posterior surface Pec. Major m.	Ribs and intercostal muscles	Medial border of Pec. Minor m.	Thoracic inlet
Internal mammary	Superior aspect of the medial 1st rib.	Cranial aspect of the 4th rib	- [e]	- [e]	- [e]	- [e]

Contouring Comments: Regional Nodal Volumes

[a] Supraclavicular caudal border meant to approximate the superior aspect of the breast/ chestwall field border

[b] Axillary level I caudal border is clinically at the base of the anterior axillary line

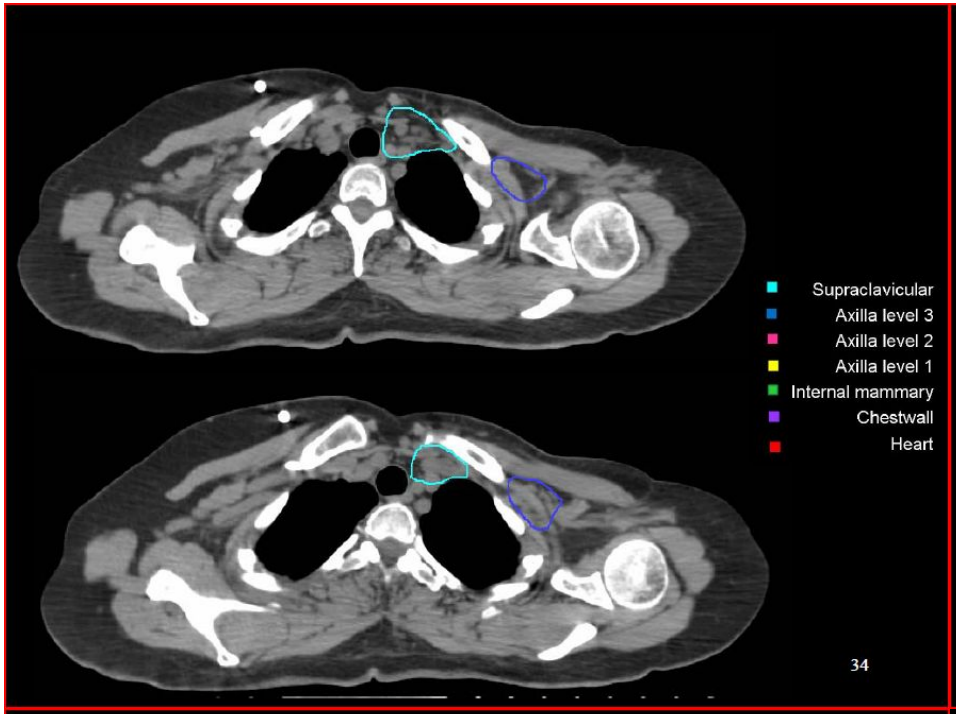
[c] Axillary level II caudal border is the same as the cranial border of level 1

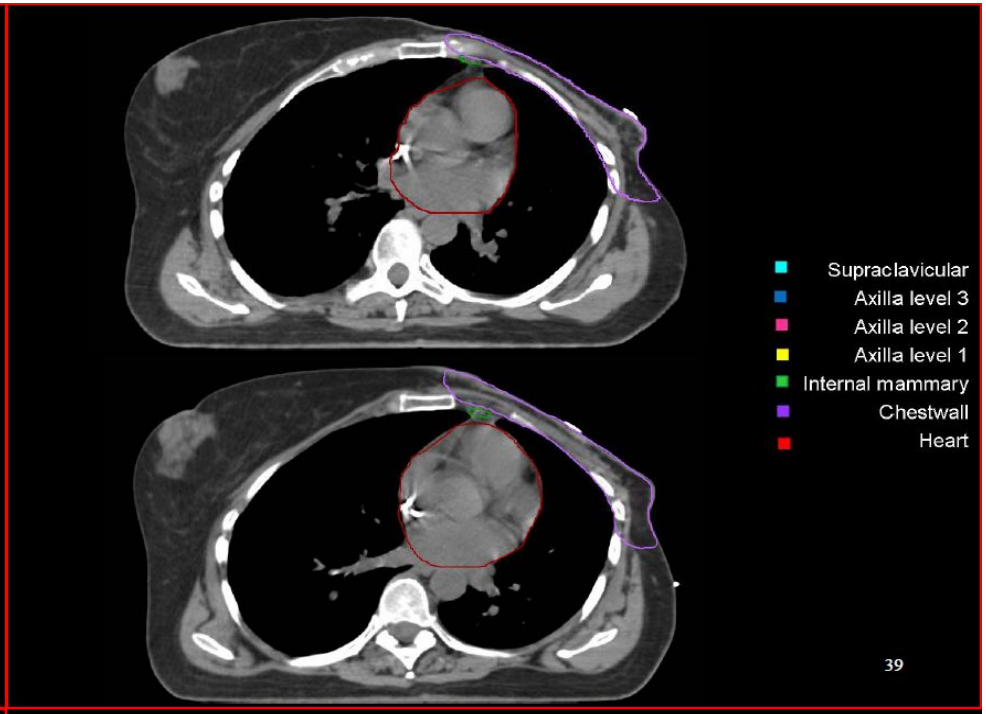
[d] Axillary level III caudal border is the same as the cranial border of level II

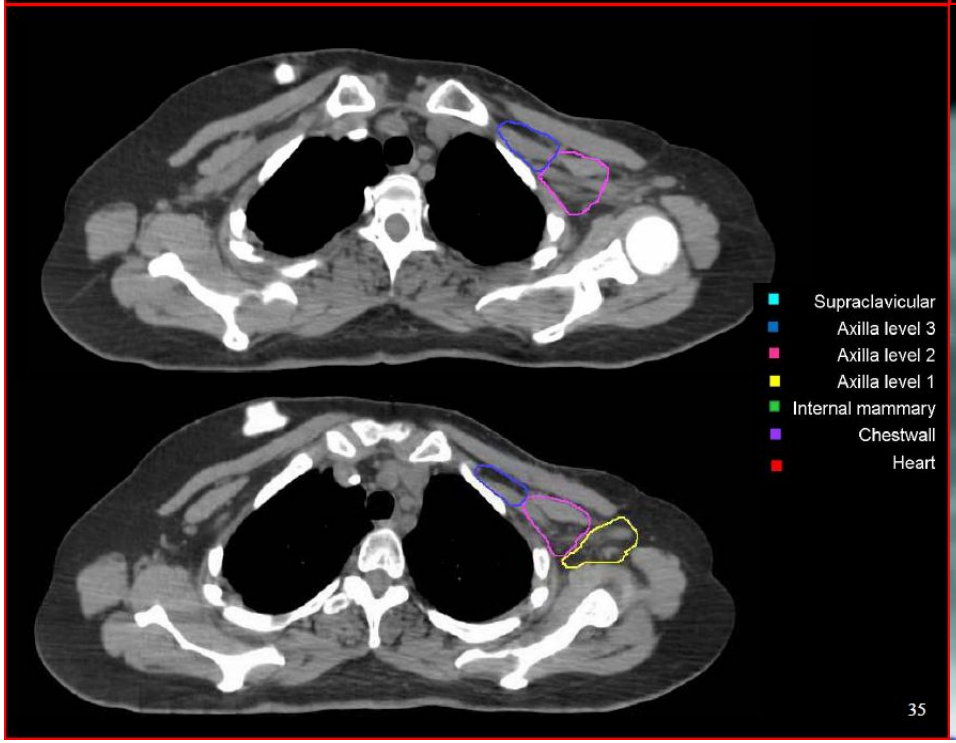
[e] Internal Mammary lymph nodes: encompass the internal mammary/ thoracic vessels

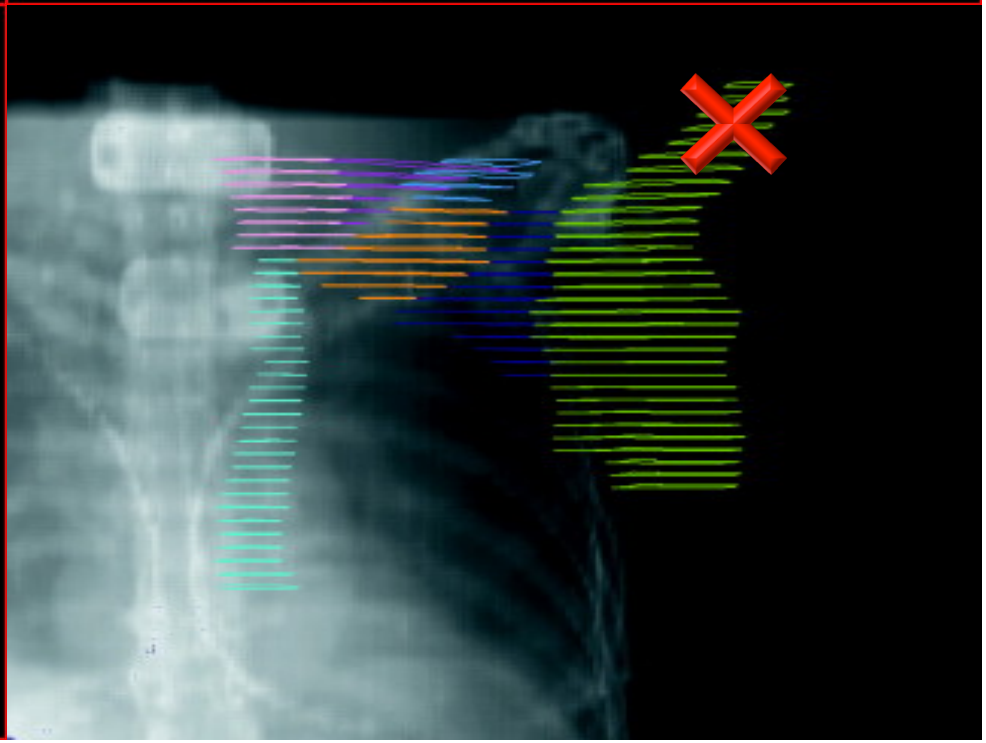
Breast Cancer Atlas for Radiation Therapy Planning: Consensus Definitions

RTOG
RADIATION THERAPY ONCOLOGY GROUP


Supraclavicular
Axilla level 3
Axilla level 2
Axilla level 1
Internal mammary
Chestwall
Heart
34


Supraclavicular
Axilla level 3
Axilla level 2
Axilla level 1
Internal mammary
Chestwall
Heart
39


Supraclavicular
Axilla level 3
Axilla level 2
Axilla level 1
Internal mammary
Chestwall
Heart
35

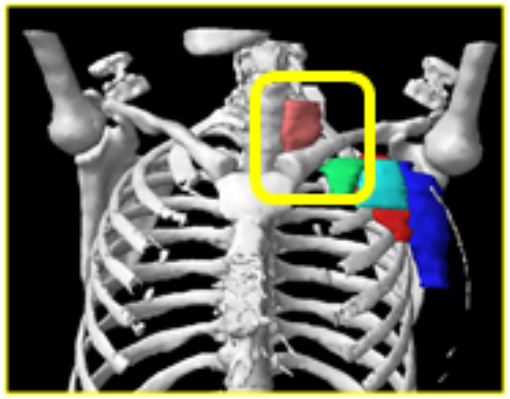


RT segue la dissezione ascellare (pre-AMAROS)

Linfonodi III livello

Linfonodi sopraclaverari

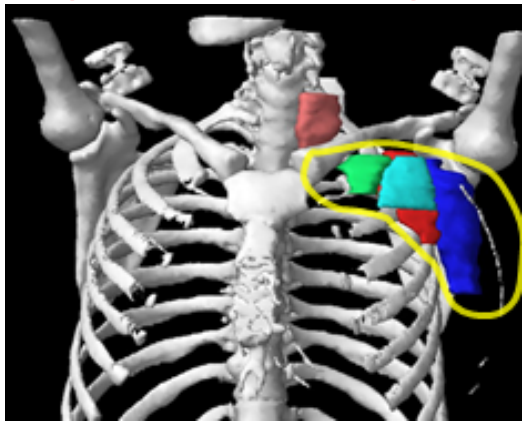
Linfonodi mammari interni
(su indicazione clinica)



RT sostituisce la dissezione ascellare, ed è stata attuata la biopsia del solo N sentinella (AMAROS)

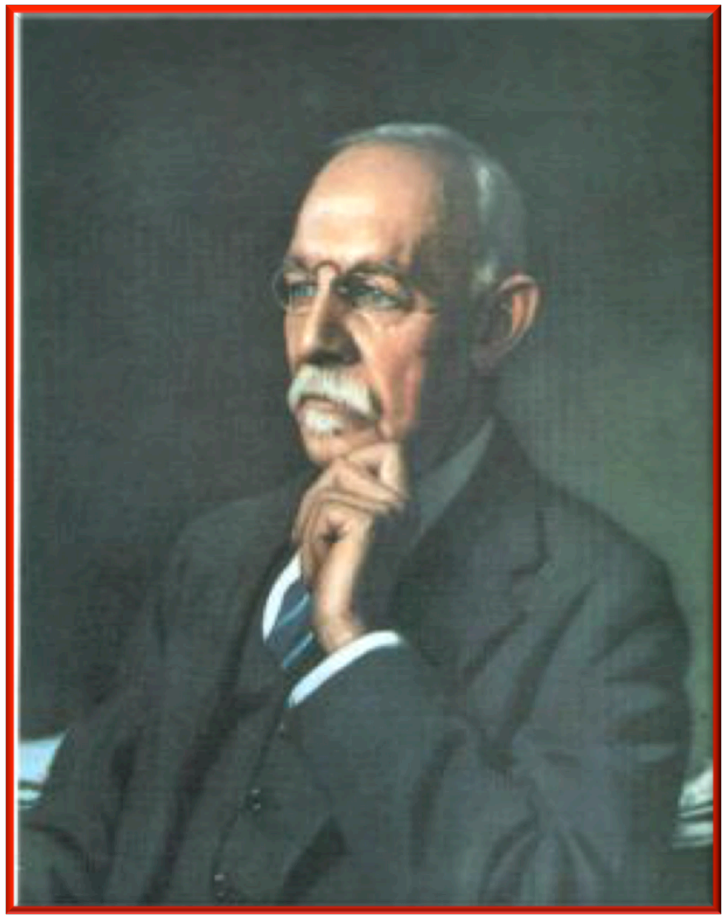
Linfonodi I –II livello

Linfonodi III livello
(opzionale)



RADIOTERAPIA DELLE STAZIONI LINFONODALI

- **QUALI**
- **QUANDO**
- **COME**



William S. Halsted
1852 - 1922

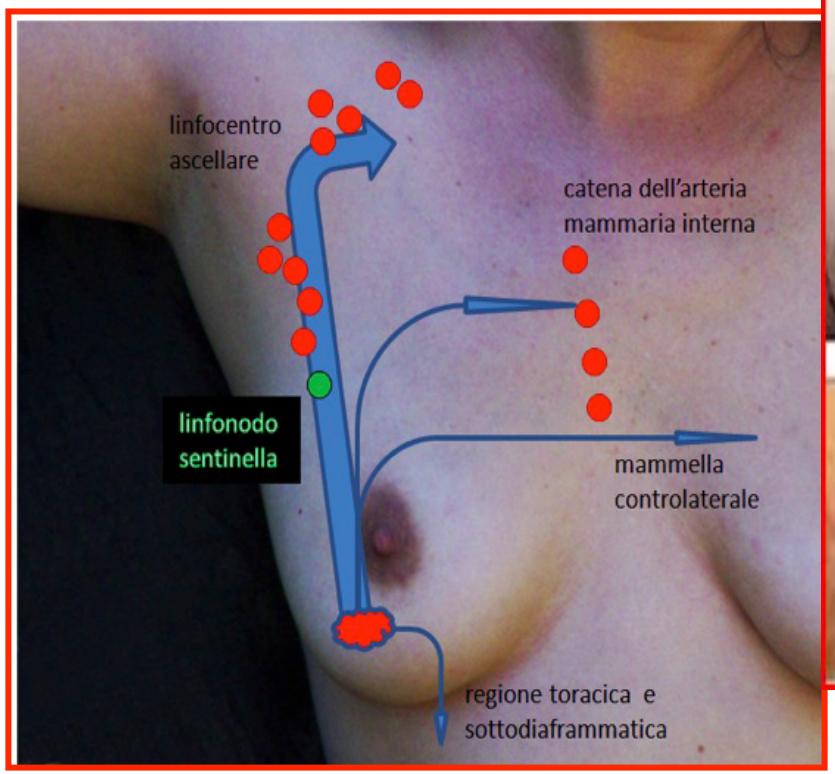
Malattia loco-regionale a diffusione centrifuga che segue ben determinate vie anatomiche

TABELLA 1 Cronologia dello sviluppo dei principali concetti che hanno influito sul trattamento del tumore della mammella

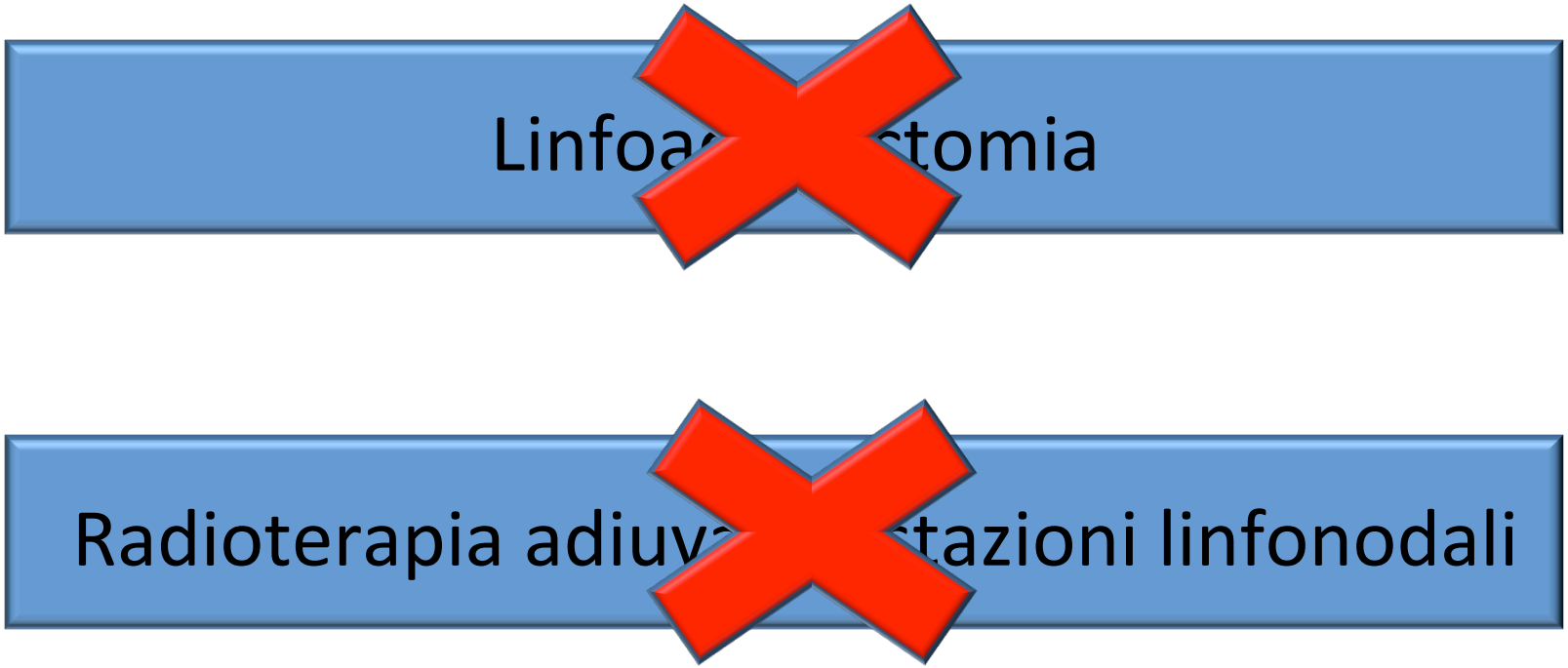
1750 ca.	Ipotesi di una origine locale della malattia	Henri François Le Dran[11]
1750 ca.	Mastectomia con escissione in blocco della mammella e dei linfonodi ascellari palpabili	Jean-Louis Petit[9]
1838	Origine cellulare del cancro	Johannes Müller[4]
1858	Effetto barriera dei linfonodi ascellari	Rudolph Virchow[5]
1867	Diffusione locale della malattia in senso centrifugo	Charles H. Moore[13]
1875	Inclusione della fascia del muscolo gran pettorale nella mastectomia	Richard von Volkmann[50]
1894	Mastectomia radicale classica	William S. Halsted,[15] Willy Meyer[17]
1896	Ovariectomia bilaterale nel trattamento del tumore metastatico	George Beatson[19]
1922	Radioterapia come trattamento primario del tumore mammario	Geoffrey Keynes[22]
1941	Mastectomia semplice seguita da radioterapia	Robert Mc Whirther[23]
1943	Prima stadiazione ad ampia diffusione del tumore mammario	Cushman Haagensen e Arthur Purdy Stout[51]
1948	Mastectomia radicale estesa ai linfonodi della catena mammaria interna	M. Margottini[24]
1948	Mastectomia radicale modificata	David Howard Patey e W.H. Dyson[31]
1950-1960	Tumorectomia semplice seguita da radioterapia loco-regionale	François Baclesse[42], Sakari Mustakallio[52]
1961	Primo trial di chirurgia conservativa	H. Atkins e J.L. Hayward[53]
1966	Isolamento della proteina del recettore estrogenico	Elwood V. Jensen[20]
1975-1976	Primo trial di chemioterapia adjuvante	Gianni Bonadonna[54]
1980	Formulazione della *teoria alternativa* alla teoria meccanicistica di Halsted sulla diffusione dei tumori mammari	Bernard Fisher, John Devitt e George Crile[29]
1987	Formulazione della *teoria dello spettro* sulla diffusione dei tumori mammari	Samuel Hellman e Jay Harris[30]
1991	Sviluppo della biopsia del linfonodo sentinella	Armando Giuliano[55]
1994	Identificazione del gene BRCA1, seguita l'anno successivo dal BRCA2	Steven Narod[56]

Il riscontro sempre più frequente di linfonodi negativi, associato alla dimostrazione che lo svuotamento ascellare non forniva un reale vantaggio sulla sopravvivenza , ha suggerito lo sviluppo di un metodo meno invasivo per la stadiazione dell'ascella……

Linfonodo sentinella



Linfonodo sentinella negativo

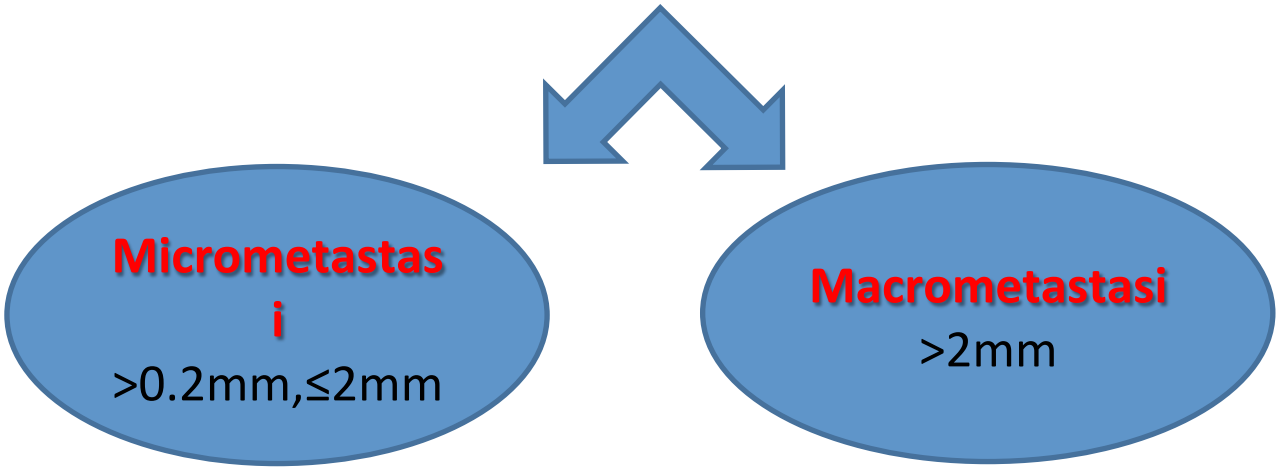


Airo linee guida
NCCN guidelines

Linfonodo sentinella positivo:

evoluzione nell'approccio terapeutico

Linfoadenectomia può essere omessa ……??

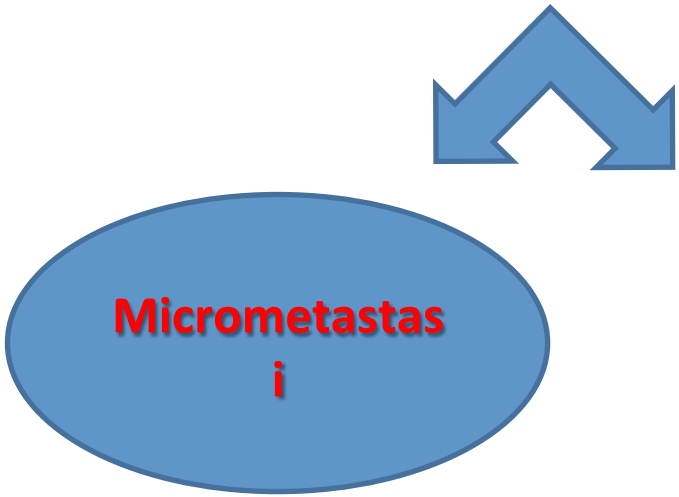


Classificazione AJCC 2009 (settima edizione)

Linfonodo sentinella positivo:

evoluzione nell'approccio terapeutico

Linfoadenectomia può essere omessa ……??

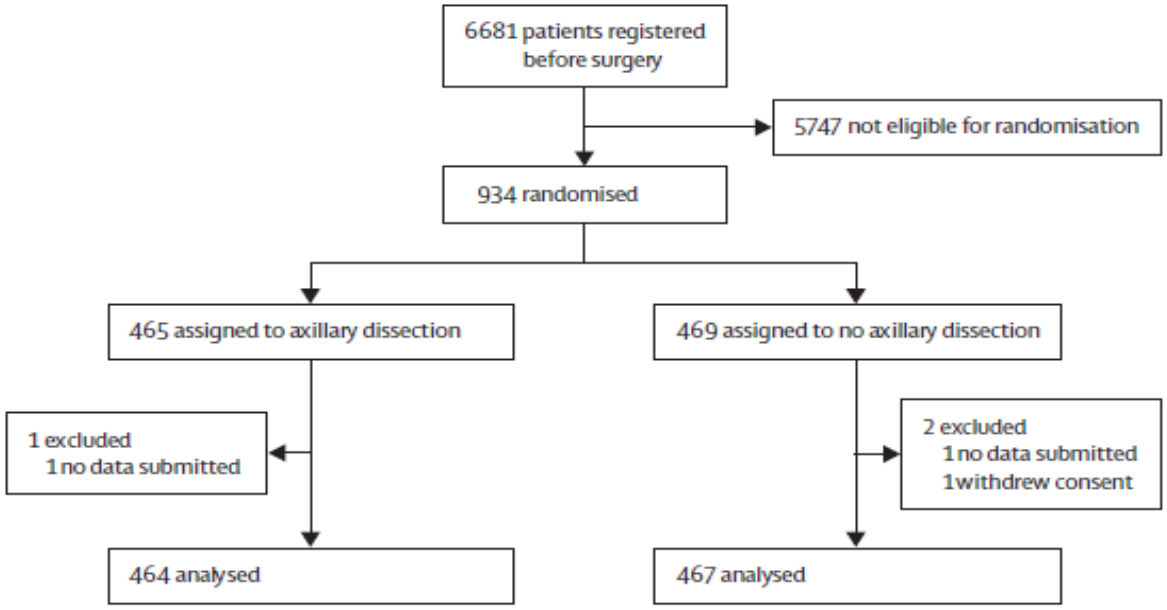


Lancet Oncol 2013; 14: 297–305

Axillary dissection versus no axillary dissection in patients with sentinel-node micrometastases (IBCSG 23–01): a phase 3 randomised controlled trial

Viviana Galimberti, Bernard F Cole, Stefano Zurrida, Giuseppe Viale, Alberto Luini, Paolo Veronesi, Paola Baratella, Camelia Chifu, Manuela Sargenti, Mattia Intra, Oreste Gentilini, Mauro G Mastropasqua, Giovanni Mazzarol, Samuele Massarut, Jean-Rémi Garbay, Janez Zgajnar, Hanne Galatius, Angelo Recalcati, David Littlejohn, Monika Bamert, Marco Colleoni, Karen N Price, Meredith M Regan, Aron Goldhirsch, Alan S Coates, Richard D Gelber, Umberto Veronesi, for the International Breast Cancer Study Group Trial 23–01 investigators

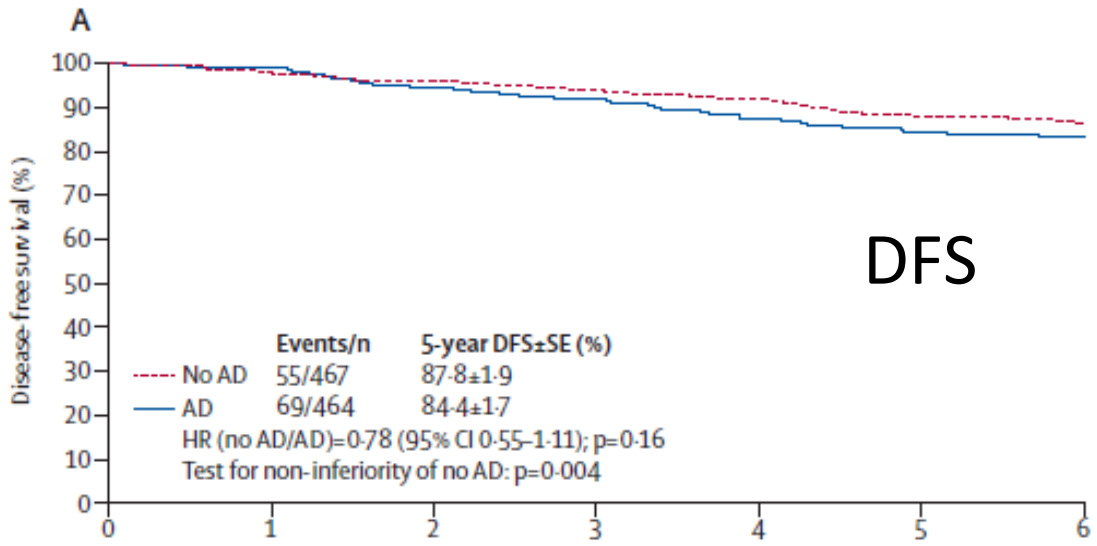
They were included in the trial and randomised if, during or following surgical treatment for breastncancer, they were found to have a tumour ≤5 cm in maximum diameter by pathological measurement of the surgical specimen, and one or more micrometastatic (≤2 mm) foci in the SNs, but no macrometastatic disease.



	Axillary dissection (n=464)	No axillary dissection (n=467)
Disease-free survival events*		
Total	69 (15%)	55 (12%)
Breast cancer events		
Local	10 (2%)	8 (2%)
Regional	1 (<1%)	5 (1%)
Distant	34 (7%)	25 (5%)
Contralateral breast	3 (<1%)	9 (2%)
Non-breast cancer events		
Second (non-breast) primary†	20 (4%)	6 (1%)
Death without cancer event	1 (<1%)	2 (<1%)
Deaths		
Total	19 (4%)	17 (4%)

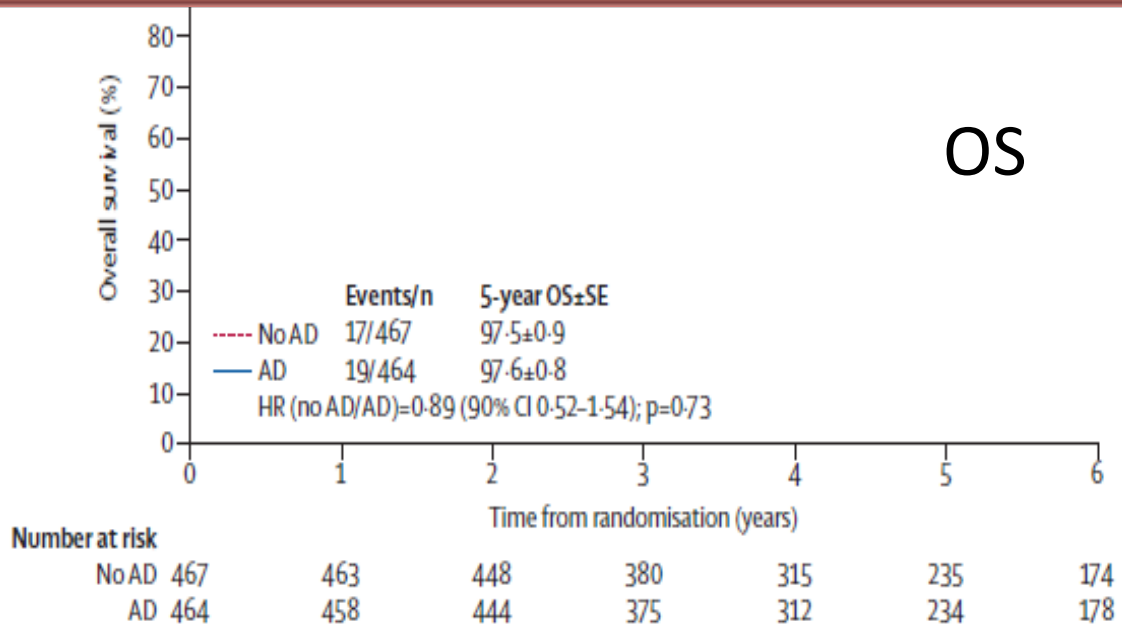
*Includes all breast cancer events, all non-breast cancer events, and deaths with cause unknown. †Types (number) of second primaries in the group with axillary dissection were gastrointestinal (four), genitourinary (two), gynaecological (six), haematological (two), laryngeal (two), lung (one), and sarcoma (three). Types (number) in the group without axillary dissection were gastrointestinal (two), gynaecological (three), and melanoma (one).

Table 3: Disease-free survival events and deaths at 5·0 years median follow-up of intention-to-treat population



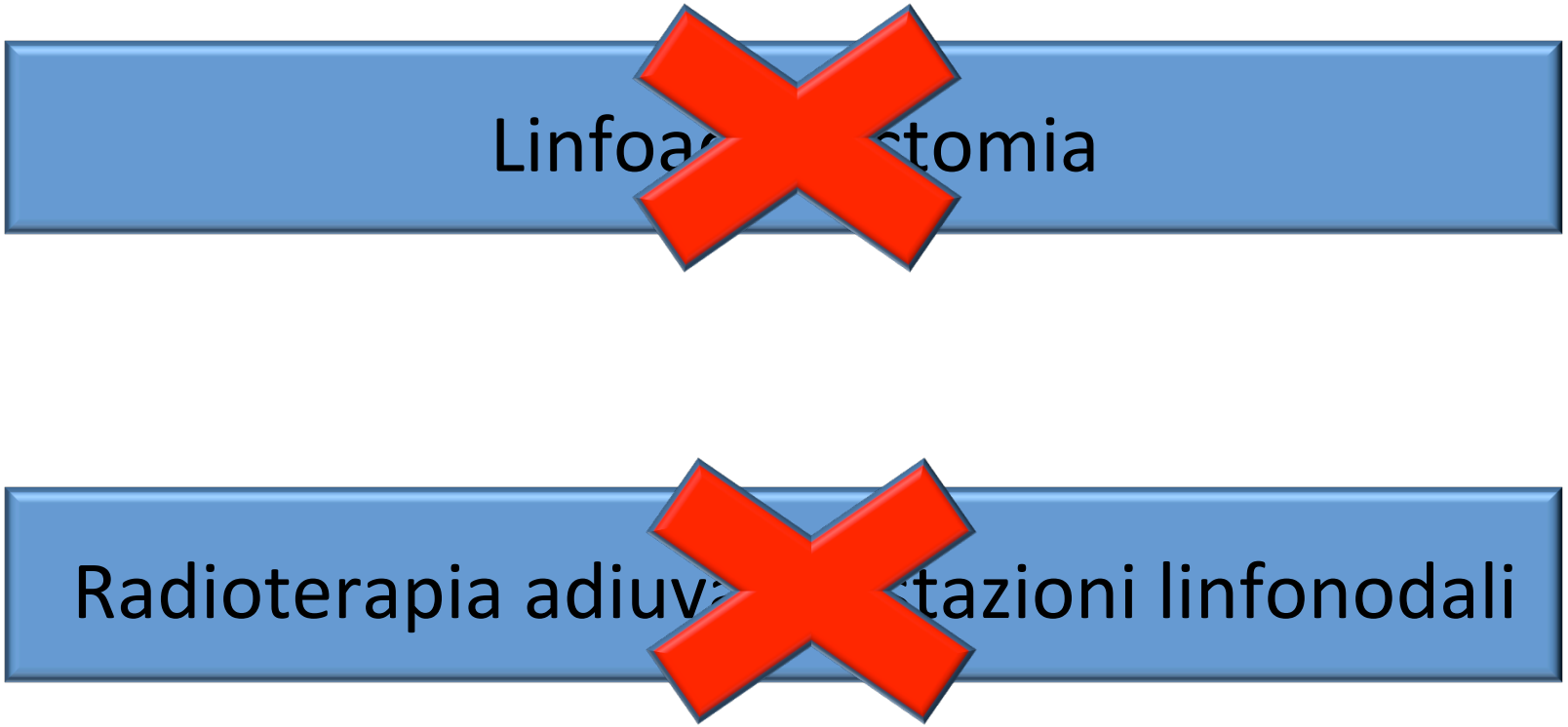
DFS

Non differenze in DFS e OS statisticamente significative in pz con micrometastasi nel linfonodo sentinella



OS

Linfonodo sentinella positivo: *micrometastasi*



Airo linee guida
NCCN guidelines

Linfonodo sentinella positivo:

evoluzione nell'approccio terapeutico

Linfoadenectomia può essere omessa ……??

Macrometastasi

Lancet oncol 2014
S1470-2045(14)70460-7

Radiotherapy or surgery of the axilla after a positive sentinel node in breast cancer (EORTC 10981-22023 AMAROS): a randomised, multicentre, open-label, phase 3 non-inferiority trial

Mila Donker, Geertjan van Tienhoven, Marieke E Straver, Philip Meijnen, Cornelis J H van de Velde, Robert E Mansel, Luigi Cataliotti, A Helen Westenberg, Jean H G Klinkenbijl, Lorenzo Orzalesi, Willem H Bouma, Huub C J van der Mijle, Grard A P Nieuwenhuijzen, Sanne C Veltkamp, Leen Slaets, Nicole J Duez, Peter W de Graaf, Thijs van Dalen, Andreas Marinelli, Herman Rijna, Marko Snoj, Nigel J Bundred, Jos W S Merkus, Yazid Belkacemi, Patrick Petignat, Dominic A X Schinagl, Corneel Coens, Carlo G M Messina, Jan Bogaerts, Emiel J T Rutgers

Ipotesi : **radioterapia ascellare offre le stesse probabilità di controllo locale e sopravvivenza – con meno effetti collaterali – rispetto alla dissezione ascellare.**

Obiettivo primario: dimostrare la «non-inferiorità» in termini di **recidive ascellari**

Obiettivi secondari : confrontare **OS e DFS**; linfedema, funzionalità della spalla e QoL

	Axillary lymph node dissection (n=744)	Axillary radiotherapy (n=681)
Baseline characteristics		
Age, years	56 (48–64)	55 (48–63)
Menopausal status		
Premenopausal	283 (38%)	289 (42%)
Postmenopausal	449 (60%)	384 (56%)
Missing	12 (2%)	8 (1%)
Preoperative ultrasound axilla		
Done	440 (59%)	419 (62%)
Not done	304 (41%)	262 (38%)
Tumour on dominant side		
Yes	377 (51%)	329 (48%)
No	352 (47%)	336 (49%)
Bilateral	8 (1%)	2 (<1%)
Missing	7 (1%)	14 (2%)
Clinical tumour size		
Median (mm; IQR)	17 (13–22)	18 (13–23)
0–2 cm	612 (82%)	533 (78%)
2–5 cm	132 (18%)	143 (21%)
>5 cm	0 (0%)	1 (<1%)
Missing	0 (0%)	4 (1%)
Tumour type		
Infiltrating ductal	563 (76%)	515 (76%)
Infiltrating lobular	100 (13%)	99 (15%)
Other	81 (11%)	66 (10%)
Missing	0 (0%)	1 (<1%)
Grade		
I	179 (24%)	154 (23%)
II	356 (48%)	311 (46%)
III	192 (26%)	200 (29%)
Missing	17 (2%)	16 (2%)
Type of breast surgery		
Breast-conserving surgery	609 (82%)	557 (82%)
Mastectomy	127 (17%)	121 (18%)
Missing	8 (1%)	3 (<1%)

(Table 1 continues on next page)

(Continued from previous page)

	Axillary lymph node dissection (n=744)	Axillary radiotherapy (n=681)
Adjuvant radiotherapy		
Breast	597 (80%)	546 (80%)
Chest wall	34 (5%)	51 (7%)
Internal mammary chain	72 (10%)	65 (10%)
Systemic treatment administered		
Any systemic treatment	666 (90%)	612 (90%)
Chemotherapy	453 (61%)	418 (61%)
Hormonal therapy	585 (79%)	525 (77%)
Immunotherapy	45 (6%)	44 (6%)
Sentinel node characteristics		
Number of sentinel nodes removed		
1	332 (45%)	293 (43%)
2	201 (27%)	217 (32%)
3	127 (17%)	105 (15%)
≥4	84 (11%)	66 (10%)
Number of positive sentinel nodes		
1	581 (78%)	512 (75%)
2	127 (17%)	134 (20%)
3	29 (4%)	27 (4%)
≥4	7 (1%)	8 (1%)
Size of the largest sentinel node metastasis		
Macrometastasis	442 (59%)	419 (62%)
Micrometastasis	215 (29%)	195 (29%)
Isolated tumour cells	87 (12%)	67 (10%)
Number of positive additional nodes (besides sentinel node)		
0	451/672 (67%)*	26/69 (38%)†
1–3	168/672 (25%)*	24/69 (35%)†
≥4	52/672 (8%)*	17/69 (25%)†
Missing	1/672 (<1%)*	2/69 (3%)†

Data are median (IQR) or number (%). Some percentages do not total 100 because of rounding. *72 patients did not have axillary lymph node dissection. †Additional metastatic lymph nodes in the axillary radiotherapy group were found in a group of patients who crossed over from axillary radiotherapy to axillary lymph node dissection and are thus not representative of the number of additional nodes in the whole group.

***Table 1*: Baseline and treatment characteristics**

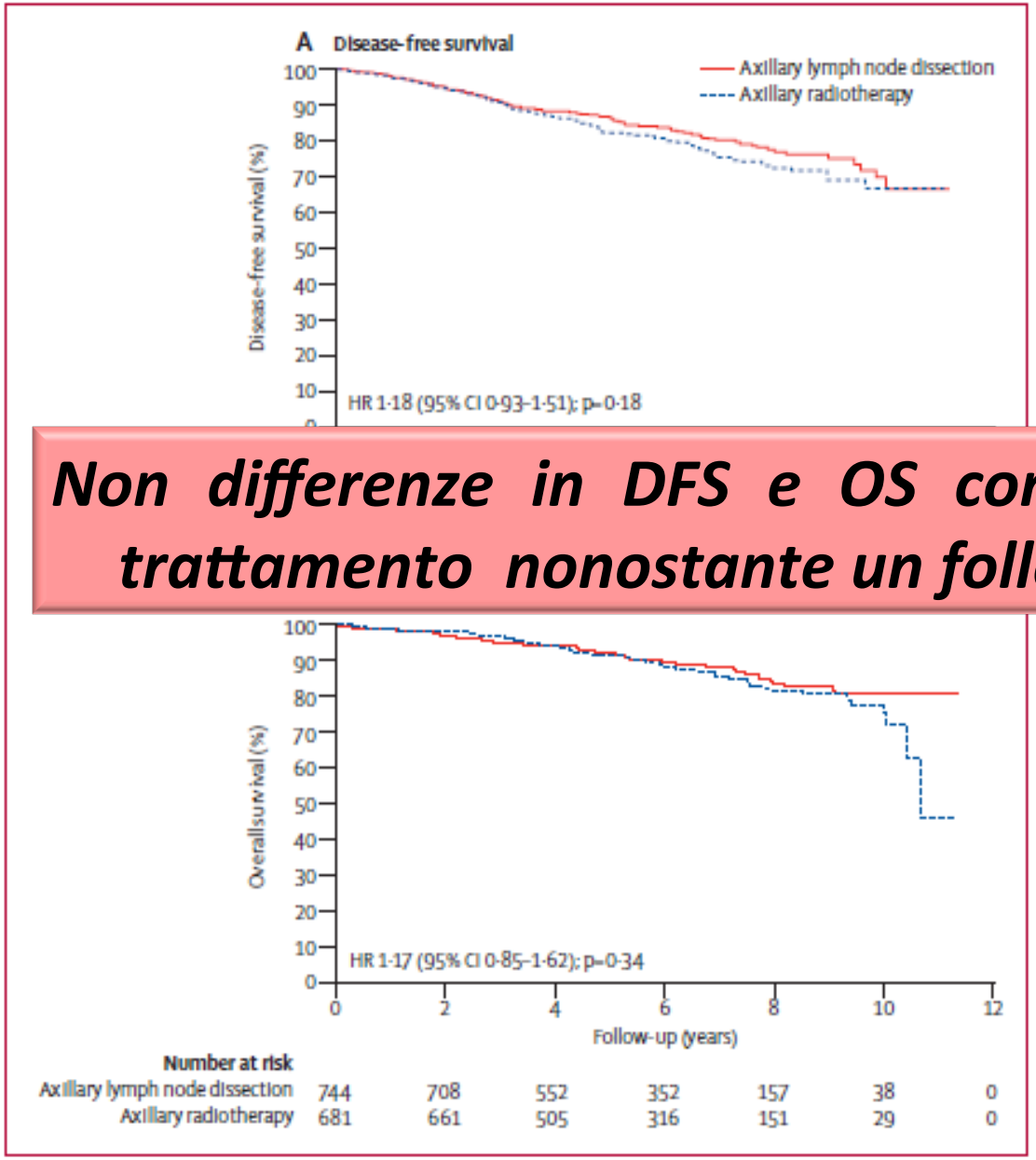
Obbiettivo primario

Sia la dissezione ascellare che la RT ascellare offrono un ottimo livello di controllo locoregionale

Ma……

Troppo pochi eventi per essere significativi

Obbiettivi secondari



Non differenze in DFS e OS con le due metodiche di trattamento nonostante un follow-up breve

Disease-free survival

the five year estimates were **86.9%** for axillary lymph node dissection and **82.6%** for axillary radiotherapy (p=0.18).

Overall survival

the five year estimates were **93.3%** for the lymph node dissection and **92.5%** for axillary radiotherapy (p=0.34),

Obbiettivi secondari

	Axillary lymph node dissection	Axillary radiotherapy	p value
Clinical sign of lymphoedema in the ipsilateral arm			
Baseline	3/655 (<1%)	0/586 (0%)	0·25
1 year	114/410 (28%)	62/410 (15%)	<0·0001
3 years	114/373 (31%)	62/341 (18%)	<0·0001
5 years	114/328 (35%)	62/286 (22%)	<0·0001
Arm circumference increase ≥10% of the ipsilateral upper or lower arm, or both			
Baseline	33/655 (5%)	24/586 (4%)	0·497
1 year	32/410 (8%)	24/410 (6%)	0·332
3 years	38/373 (10%)	22/341 (6%)	0·080
5 years	43/328 (13%)	16/286 (6%)	0·0009

Data are n/N (%), unless otherwise specified.

Table 2: Lymphoedema

Minor incidenza di linfedema statisticamente significativa nel braccio della RT

Riassumendo……

Dissezione ascellare

N – NO RT

N + > 4→ RT delle stazioni linfonodali
(TUTTE LE LINEE GUIDA)

N + 1-3→ RT in pz con fattori prognostici
sfavorevoli quali: (G3, OR neg, Ki67, LVI nodal ratio, ECE; età…)

Biopsia N sentinella

N- → NO RT

N+ → dissezione ascellare 1-2 livello /3 se necessario, ± RT in base al n° di linfonodi positivi

N+ → non dissezione → NO RT

Axillary Dissection vs No Axillary Dissection in Women With Invasive Breast Cancer

Among patients with limited sln metastatic breast cancer treated with breast conservation and systemic terapy, the use slnd alone compared with alnd did not result in inferior survival

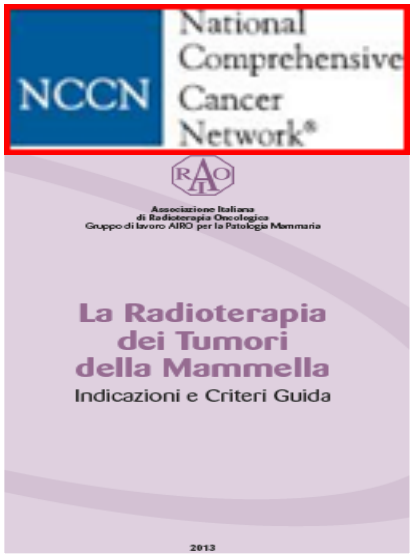
Radioterapia post-mastectomia: Parete toracica + linfonodi

La Radioterapia dei Tumori della Mammella. Indicazioni e Criteri Guida

Tabella 1 Radioterapia post-mastectomia: indicazioni

• T3N+ e nei T4 qualsiasi N. T3N0 valutare in base ai fattori di rischio
• Tumore esteso alla parete toracica e/o al muscolo pettorale e/o o alla cute, indipendentemente dallo stato linfonodale
• Tumore di dimensioni fino a 5 cm (T1-2) e numero di linfonodi ascellari positivi ³ 4
• Margini positivi

età inferiore a 40-45 anni, negatività recettoriale, invasione linfo-vascolare
(Category 1 NCCN Guidlines)



Radioterapia post-mastectomia: Parete toracica + linfonodi

Stadio T1-2 / N 1-3, sono stati identificati come fattori prognostici:

- ***età*** (<40-45 anni),
- **dimensioni tumorali** ≥ 3,5-4 cm,
- ***negatività recettoriale***

Nonostante l'assenza di risultati di studi clinici randomizzati,
si suggerisce di informare adeguatamente la paziente ***sull'indicazione ad un trattamento radiante postoperatorio***
(category 2B NCCN).

EBCTCG (Early Breast Cancer Trialists' Collaborative Group)* Lancet 2014; 383: 2127–35

Effect of radiotherapy after mastectomy and axillary surgery on 10-year recurrence and 20-year breast cancer mortality: meta-analysis of individual patient data for 8135 women in 22 randomised trials

EBCTCG, McGale P, Taylor C, Corra C, Cutter D, Duane F, Ewertz M, Gray R, Mannu G, Peto R, Whelan T, Wang Y, Wang Z, Darby S.

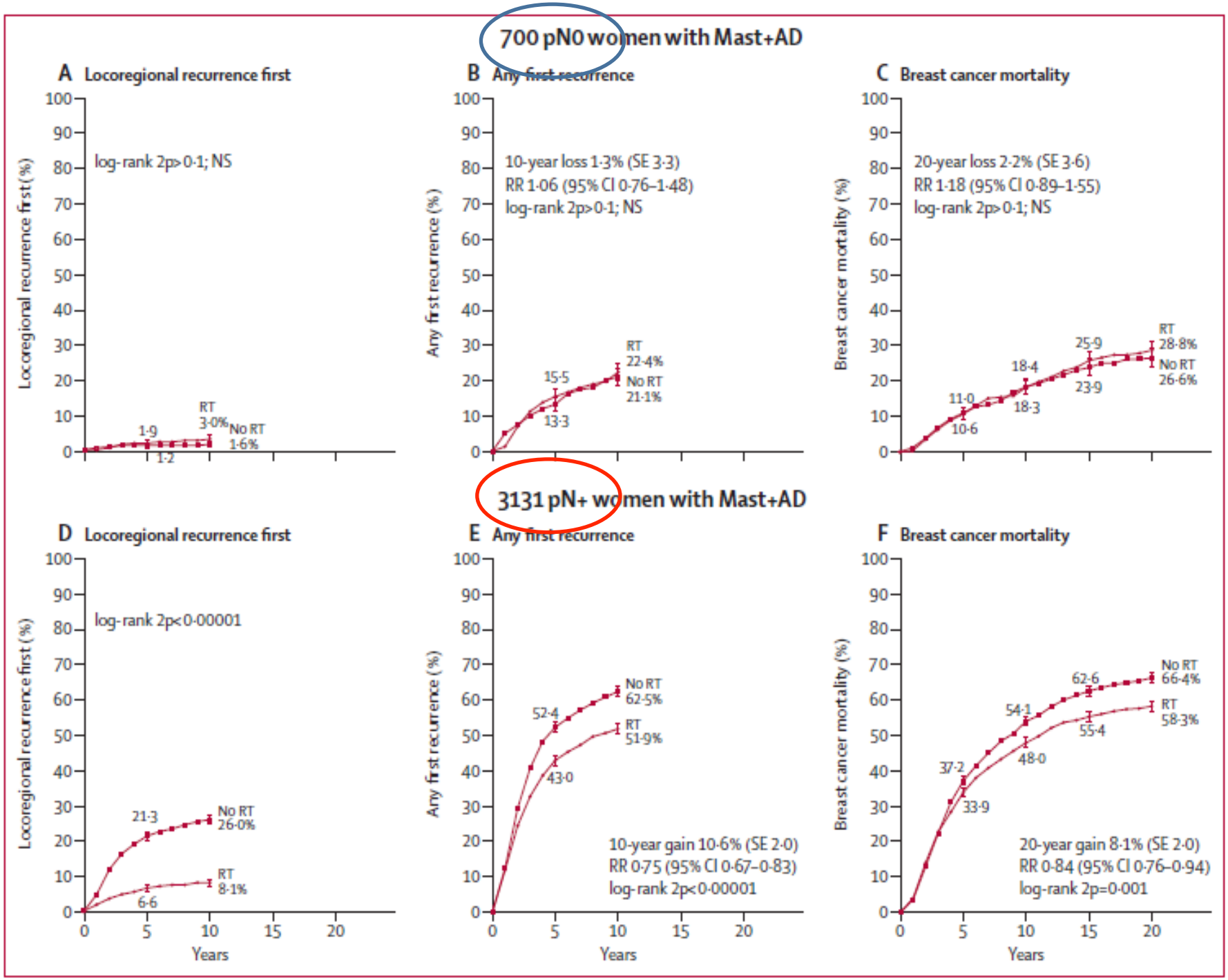
1964-1986

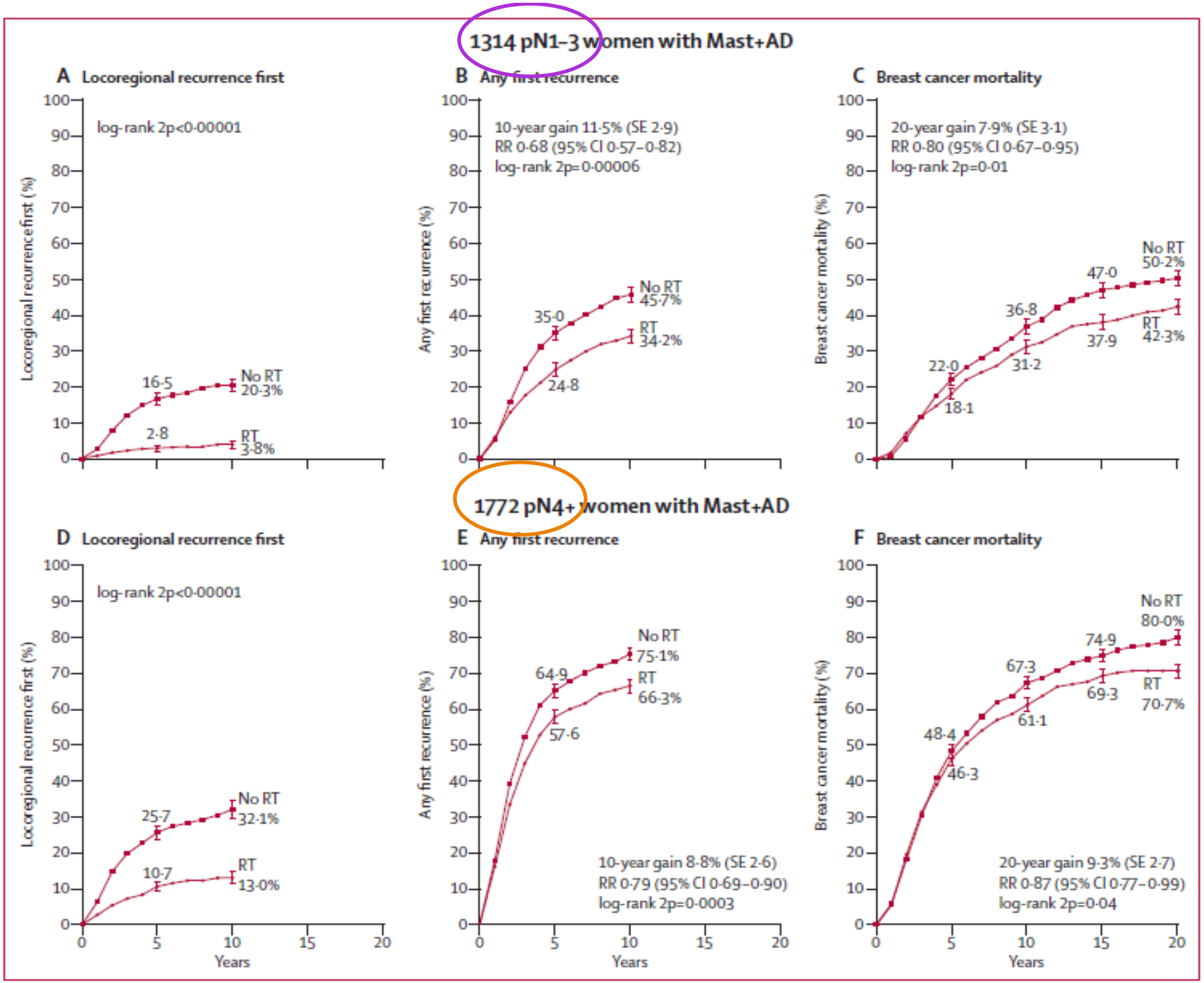
Of the 1594 women with node-negative

700 (44%) → axillary dissection
870 (55%) → axillary sampling
24 (1%) → unknown extent of axillary surgery

Of the 5821 women with node-positive disease,

3131 (54%) → axillary dissection
2541 (44%)→ axillary sampling
149 (2%) →unknown extent of axillary surgery


700 pN0 women with Mast+AD
A Locoregional recurrence first
log-rank 2p>0·1; NS
1·9
1·2
RT
3·0%
No RT
1·6%
B Any first recurrence
10-year loss 1·3% (SE 3·3)
RR 1·06 (95% CI 0·76–1·48)
log-rank 2p>0·1; NS
15·5
13·3
RT
22·4%
No RT
21·1%
C Breast cancer mortality
20-year loss 2·2% (SE 3·6)
RR 1·18 (95% CI 0·89–1·55)
log-rank 2p>0·1; NS
11·0
10·6
18·4
18·3
25·9
23·9
RT
28·8%
No RT
26·6%
3131 pN+ women with Mast+AD
D Locoregional recurrence first
log-rank 2p<0·00001
21·3
6·6
No RT
26·0%
RT
8·1%
E Any first recurrence
52·4
43·0
No RT
62·5%
RT
51·9%
10-year gain 10·6% (SE 2·0)
RR 0·75 (95% CI 0·67–0·83)
log-rank 2p<0·00001
F Breast cancer mortality
37·2
33·9
54·1
48·0
62·6
55·4
No RT
66·4%
RT
58·3%
20-year gain 8·1% (SE 2·0)
RR 0·84 (95% CI 0·76–0·94)
log-rank 2p=0·001
Locoregional recurrence first (%)
Any first recurrence (%)
Breast cancer mortality (%)
Years


1314 pN1–3 women with Mast+AD
A Locoregional recurrence first
log-rank 2p<0·00001
Locoregional recurrence first (%)
16·5
No RT
20·3%
2·8
RT
3·8%
B Any first recurrence
10-year gain 11·5% (SE 2·9)
RR 0·68 (95% CI 0·57–0·82)
log-rank 2p=0·00006
Any first recurrence (%)
35·0
No RT
45·7%
24·8
RT
34·2%
C Breast cancer mortality
20-year gain 7·9% (SE 3·1)
RR 0·80 (95% CI 0·67–0·95)
log-rank 2p=0·01
Breast cancer mortality (%)
22·0
18·1
36·8
31·2
47·0
37·9
No RT
50·2%
RT
42·3%
1772 pN4+ women with Mast+AD
D Locoregional recurrence first
log-rank 2p<0·00001
Locoregional recurrence first (%)
25·7
No RT
32·1%
10·7
RT
13·0%
Years
E Any first recurrence
Any first recurrence (%)
64·9
No RT
75·1%
57·6
RT
66·3%
10-year gain 8·8% (SE 2·6)
RR 0·79 (95% CI 0·69–0·90)
log-rank 2p=0·0003
Years
F Breast cancer mortality
Breast cancer mortality (%)
48·4
46·3
67·3
61·1
74·9
69·3
No RT
80·0%
RT
70·7%
20-year gain 9·3% (SE 2·7)
RR 0·87 (95% CI 0·77–0·99)
log-rank 2p=0·04
Years

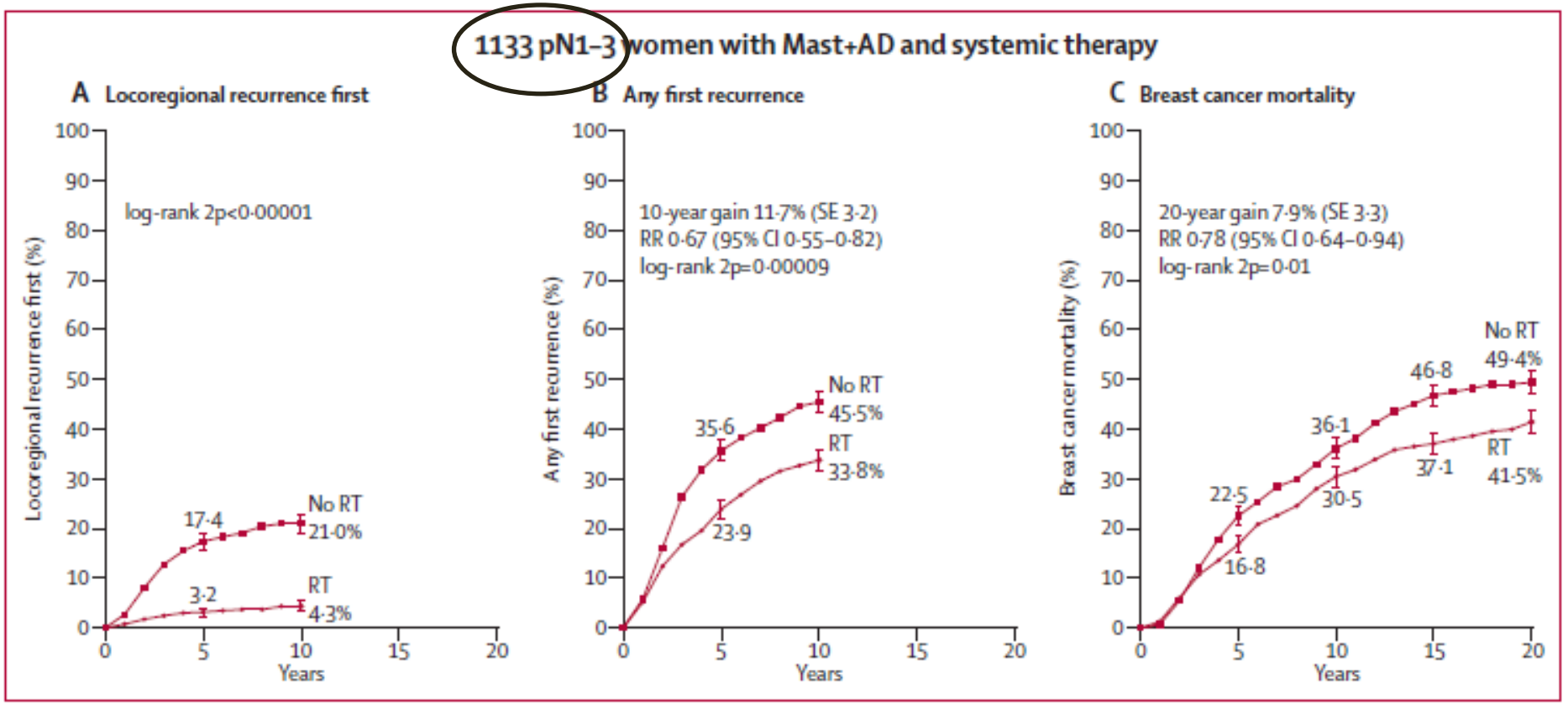


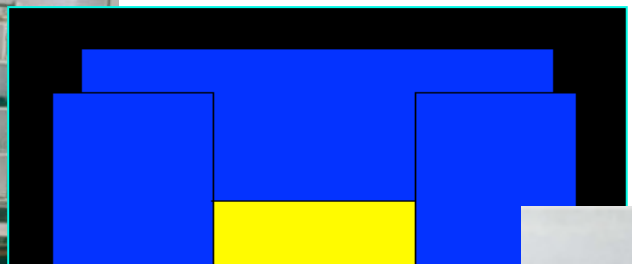
Figure 5: Effect of radiotherapy (RT) after mastectomy and axillary dissection (Mast+AD) on 10-year risks of locoregional and overall recurrence and on 20-year risk of breast cancer mortality in 1133 women with one to three pathologically positive nodes (pN1–3) in trials in which systemic therapy was given to both randomised treatment groups

RADIOTERAPIA DELLE STAZIONI LINFONODALI

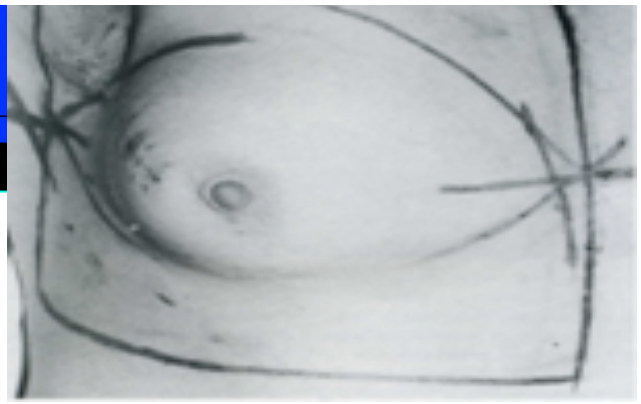
- **QUALI**
- QUANDO
- **COME**

Evoluzione tecnologica…..

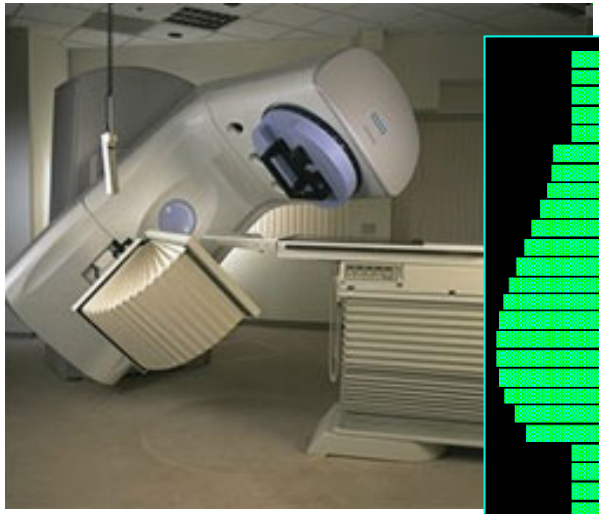
Radioterapia non conformazionale

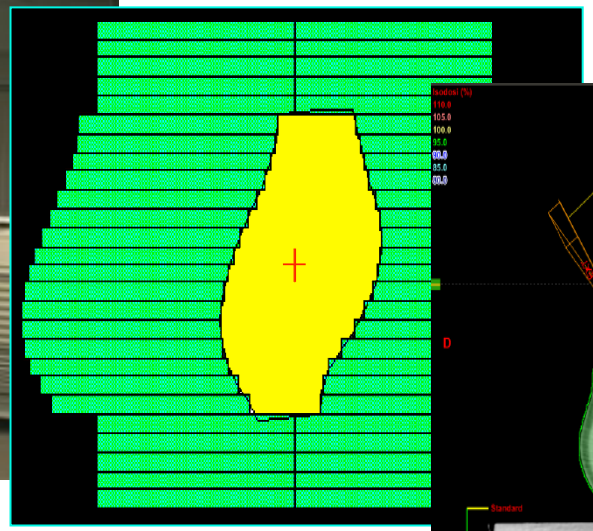


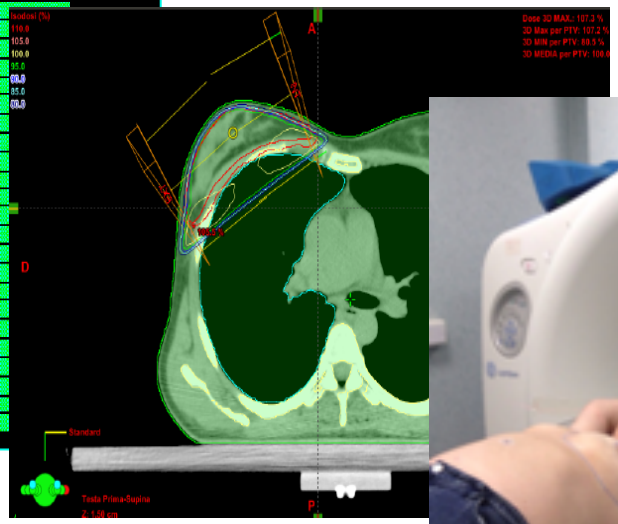
Attualmente non più utilizzata



Evoluzione tecnologica…..
3DCRT







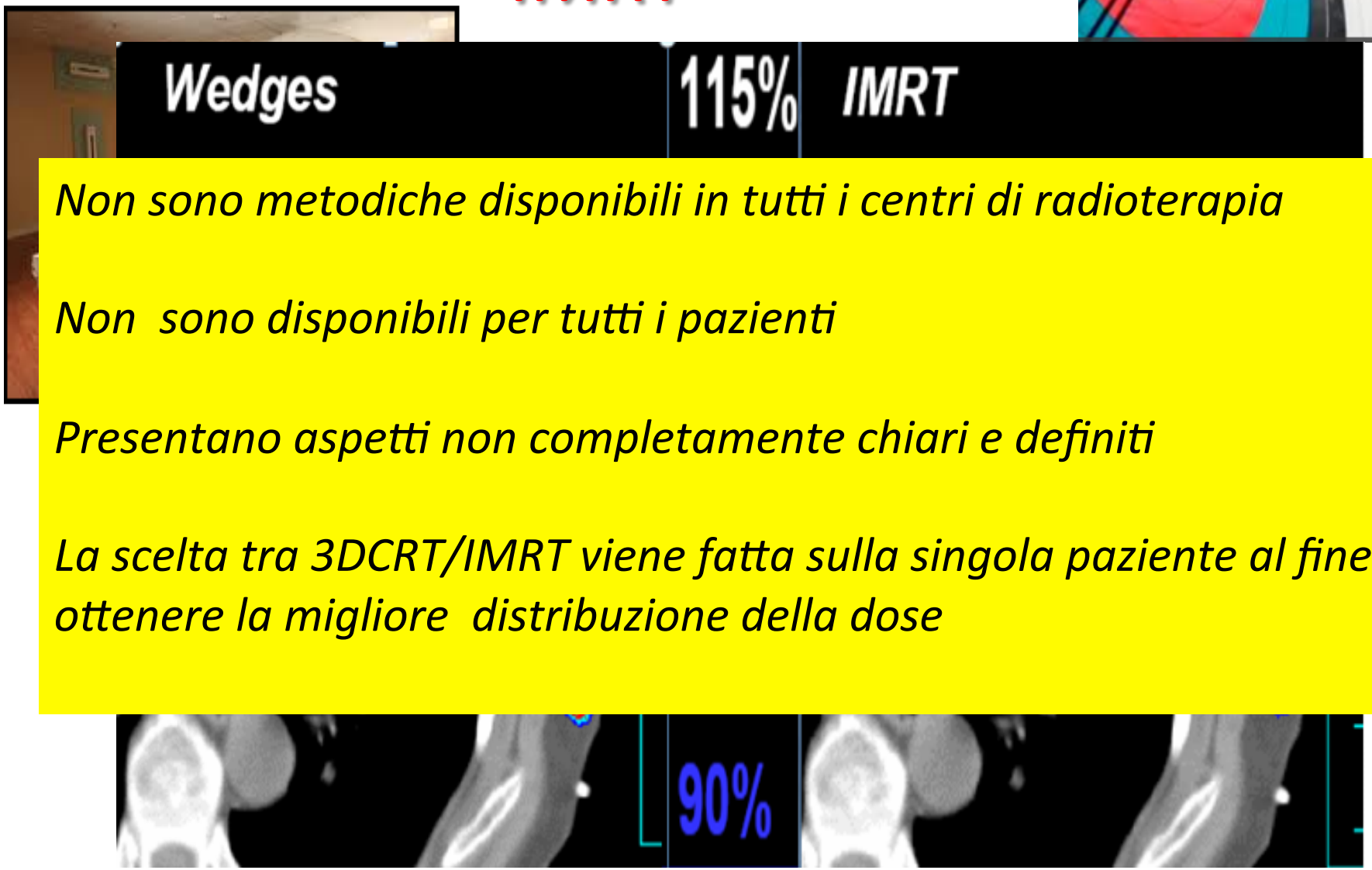
<u>Centraggio TC</u>, sezioni a coprire **l'intero volume** con <u>set up</u> accurato:

- sist. immobilizzazione,
- reperi cutanei radio-opachi,
- tatuaggi…

<u>Identificazione dei volumi</u> (CTV, PTV, OAR)

<u>Pianificazione</u> della distribuzione di dose, con TPS dedicato

Evoluzione tecnologica…..
IMRT



Non sono metodiche disponibili in tutti i centri di radioterapia

Non sono disponibili per tutti i pazienti

Presentano aspetti non completamente chiari e definiti

La scelta tra 3DCRT/IMRT viene fatta sulla singola paziente al fine di ottenere la migliore distribuzione della dose

Messaggio conclusivo

Nella scelta terapeutica di queste pazienti emerge sempre più il ruolo dell'approccio multidisciplinare al caso (chirurgo, oncologo, radioterapista…….!!!!!)


Grazie per l’attenzione……
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