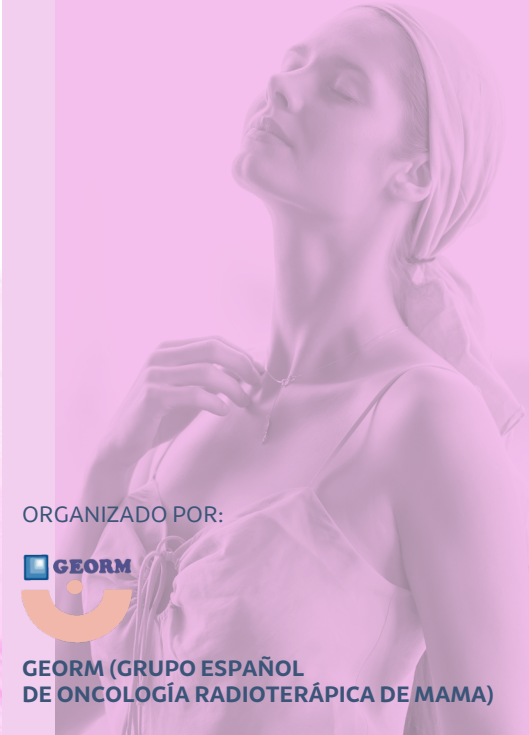
# MasterClass

## Radioterapia en cáncer de mama 2025

27 MAR 2025



ORGANIZADO POR:

GEORM (GRUPO ESPAÑOL DE ONCOLOGÍA RADIOTERÁPICA DE MAMA)

## 2ª Sesión:

# Radioterapia áreas ganglionares/ reirradiación en cáncer de mama

## Tras quimioterapia neoadyuvante

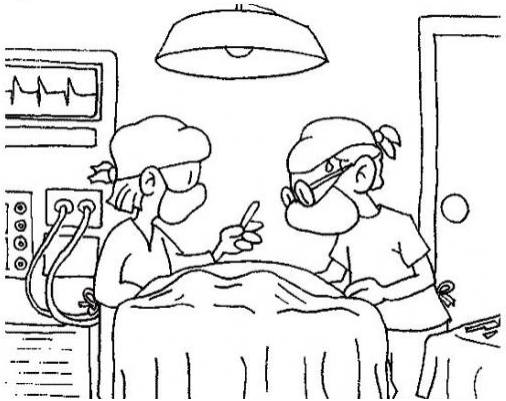
**Manuel Algara**

Hospital del Mar
Universidad Pompeu Fabra
Barcelona

SEOR
SOCIEDAD ESPAÑOLA DE ONCOLOGÍA RADIOTERÁPICA

# MasterClass Radioterapia cáncer de mama 2025

## 2ª Sesión: Radioterapia áreas ganglionares – Tras quimioterapia neoadyuvante



# ¿Que supone el tratamiento sistémico primario?

- Desconocer el pTNM
- Tener que inventar el ypTNM
- Toma de decisiones en tratamiento local sin evidencia científica
- Tratamiento local sin tumor
- ¿Se puede disminuir el tratamiento local?

Johansson *et al. Breast Cancer Research* (2021) 23:17
https://doi.org/10.1186/s13058-021-01393-z

Breast Cancer Research

RESEARCH ARTICLE Open Access

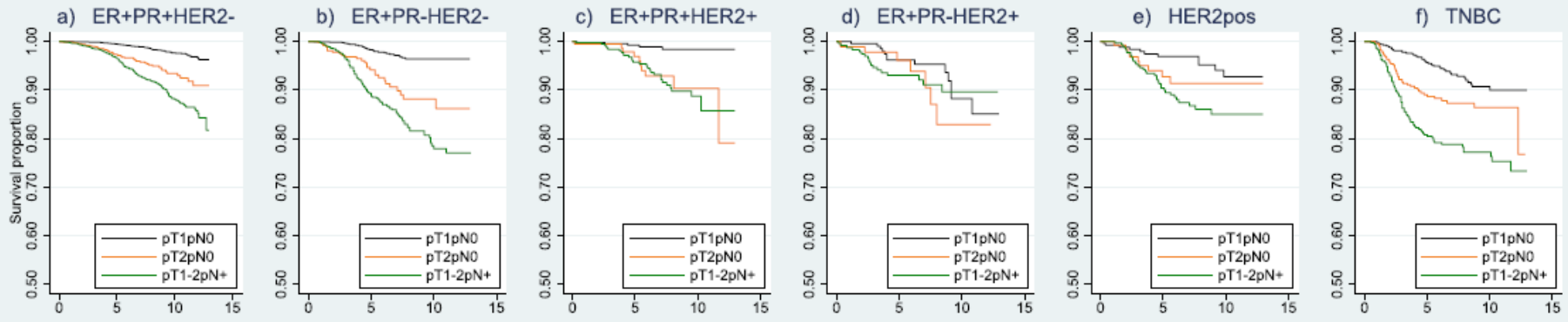
# In modern times, how important are breast cancer stage, grade and receptor subtype for survival: a population-based cohort study

Anna L. V. Johansson[1,2*], Cassia B. Trewin[3], Irma Fredriksson[4,5], Kristin V. Reinertsen[6], Hege Russnes[7,8†] and Giske Ursin[1,9,10†]

yores

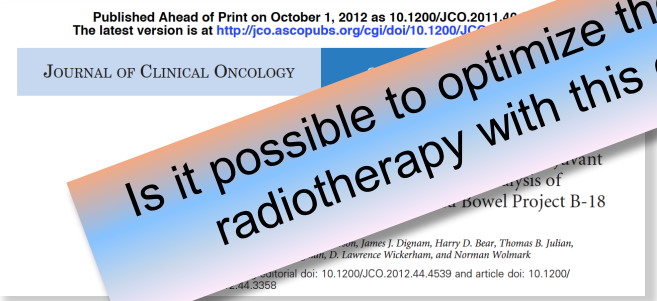
**La afectación ganglionar es un factor independiente de mal pronóstico en todos los subtipos de cáncer de mama**

?

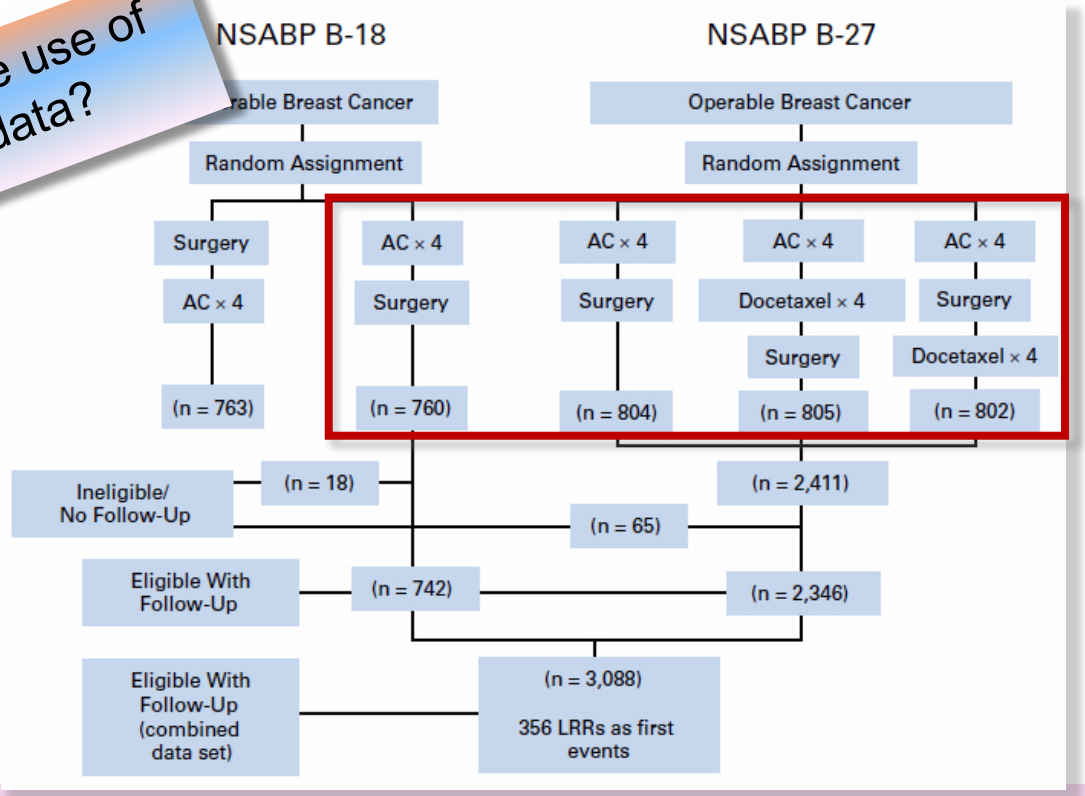


# MasterClass Radioterapia cáncer de mama 2025

## 2ª Sesión: Radioterapia áreas ganglionares – Tras quimioterapia neoadyuvante




Is it possible to optimize the use of radiotherapy with this data?




- After conservative surgery, breast irradiation only
- After mastectomy no irradiation

ONCH-1896; No. of Pages 10
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Critical Reviews in Oncology/Hematology xxx (2014) xxx–xxx

CRITICAL REVIEWS IN Oncology Hematology Incorporating Geriatric Oncology

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# Post-mastectomy radiotherapy after neodjuvant chemotherapy in breast cancer patients: A review

Jacques Bernier*

*Department of Radio-Oncology, Genolier Swiss Medical Network, Geneva and Genolier, Switzerland*

Accepted 21 October 2014

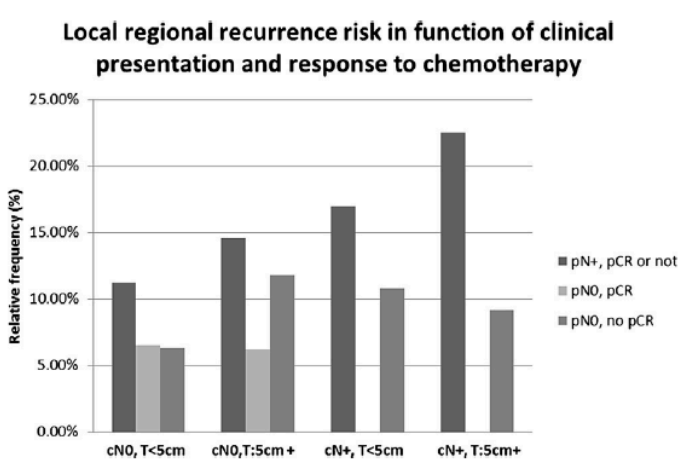


Fig. 1. Distribution of local regional risk levels in the prospective trials NSABP B-18 and B-27 (after Mamounas et al. [1]).

- NSABP-18 and 27 are not a randomized trial to analyze the rol of radiotherapy after primary systemic treatment
- **Radiotherapy indications have been established based on adjuvant irradiation indications and a retrospective studies**

## 4. Conclusions

The current literature review confirms that, following neoadjuvant chemotherapy, post-mastectomy irradiation has to be delivered selectively. Patients with locally advanced disease, especially those achieving incomplete response to chemotherapy in the primary tumour and/or lymph nodes should be irradiated postoperatively. Patients aged >40 years with clinical stages I–IIA and oestrogen-receptor positive disease do not need postmastectomy irradiation when a complete pathologic response to neo-adjuvant chemotherapy is achieved. The use or omission of post-mastectomy irradiation in the presence of 0–3 positive nodes remains poorly defined. Current and future prospective studies should allow a more precise determination of the exact risk of local regional recurrence in individuals especially in patients presenting with Stages IIB and IIIA disease achieving complete pathologic response. There are nevertheless still unresolved issues regarding the exact place of radiotherapy in the management of breast cancer patients treated by neoadjuvant chemotherapy and mastectomy. This is mainly due to the fact that so far most recommendations have been based on data retrieved from retrospective studies. Whether postmastectomy radiotherapy has to be delivered to chest wall and/or lymphatic drainage areas has to be decided on the basis of both the pre- and post-NAC status. Likewise controlled studies will enable radio-oncologist to optimize the irradiation of the peripheral lymphatics at risk of recurrence. Last but not least the use of biomarkers and molecular assays should help multidisciplinary teams identify those patients who, notwithstanding a good response to neoadjuvant chemotherapy, are at higher risk of progression and therefore need additional, postmastectomy radiotherapy.

Strahlenther Onkol
DOI 10.1007/s00066-017-1158-1

EDITORIAL

**Personalized radiotherapy for invasive breast cancer in 2017**

**National S3 guidelines and DEGRO and AGO recommendations**

Frederik Wenz[1] · Wilfried Budach[2]

Received: 17 May 2017 / Accepted: 19 May 2017


# Ante la falta de resultados, el estadio inicial es el que decide

Concerning the situation after neoadjuvant chemotherapy, there is still a paucity of data regarding the indication for PMRT. Therefore, the initial clinical staging before neoadjuvant chemotherapy is used until ongoing prospective studies have reported results (e. g., NSABP B 51).

SPECIAL SERIES: LOCOREGIONAL MANAGEMENT OF BREAST CANCER

review article

## Locoregional Management After Neoadjuvant Chemotherapy

Monica Morrow, MD[1] and Atif J. Khan, MD, MS[2]

Volume 38, Issue 20 2281

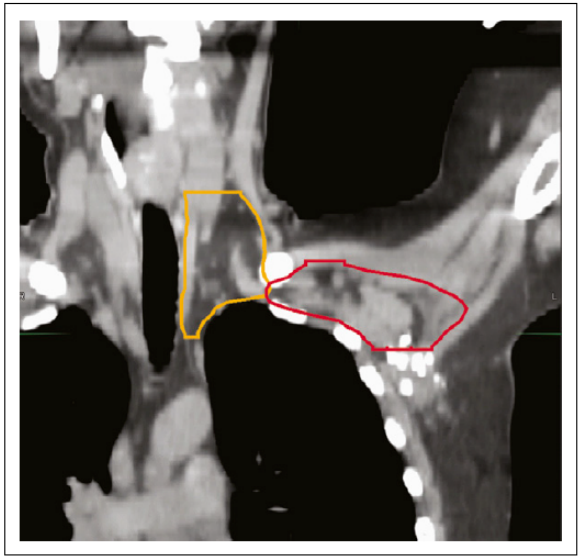

**FIG 2.** Coronal projection of axillary clinical target volume excluding axillary lymph node dissection (ALND) changes. Clips from ALND are visible in the low axilla. The axillary clinical target volume (CTV) contour (in red) begins above the visible dissection changes. The supraclavicular CTV contour appears medial and superior to the axillary CTV (orange contour).

At present, based on the data presented here and the studies of RNI after primary surgery, we consider most off-trial patients with nodal metastases at presentation to be candidates for RNI or PMRT. We acknowledge and discuss with our patients the uncertainty that exists in this area, particularly in patients with an excellent response (eg, a mastectomy patient with an HER2-positive tumor and pCR in breast and nodes). We follow the contouring guidance and the coverage and organ constraints described in the ongoing trials.

- **El aumento de la utilización del TSP en pacientes con cáncer operable provoca una dificultad en la decisión terapéutica por la falta de evidencia nivel 1**
- **El tratamiento locoregional se debe basar en el estadio pre-tratamiento y la extensión tumoral post-tratamiento**
- **Hay que esperar a que finalicen los estudios en marcha para tener evidencia nivel 1**
- **La mayoría de pacientes con cN1 son candidatas a irradiación ganglionar**

Ann Surg Oncol (2019) 26:3892–3901
https://doi.org/10.1245/s10434-019-07635-x

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

ORIGINAL ARTICLE – BREAST ONCOLOGY

# Post-Mastectomy Radiotherapy After Neoadjuvant Chemotherapy in Breast Cancer: A Pooled Retrospective Analysis of Three Prospective Randomized Trials

David Krug, MD[1,2,21], Bianca Lederer, PhD[3], Fenja Seither, MSc[3], Valentina Nekljudova, PhD[3], Beyhan Ataseven, MD[4], Jens-Uwe Blohmer, MD[5], Serban Dan Costa, MD[6], Carsten Denkert, MD[7], Nina Ditsch, MD[8], Bernd Gerber, MD[9], Claus Hanusch, MD[10], Joerg Heil, MD[11], Jörn Hilfrich, MD[12], Jens B. Huober, MD[13], Christian Jackisch, MD[14], Sherko Kümmel, MD[15], Stefan Paepke, MD[16], Christian Schem, MD[17], Andreas Schneeweiss, MD[18], Michael Untch, MD[19], Jürgen Debus, MD, PhD[1,2], Gunter von Minckwitz, MD[3], Thorsten Kühn, MD[20], and Sibylle Loibl, MD[3]

[1]Department of Radiation Oncology, University Hospital Heidelberg, Heidelberg, Germany; [2]National Center for

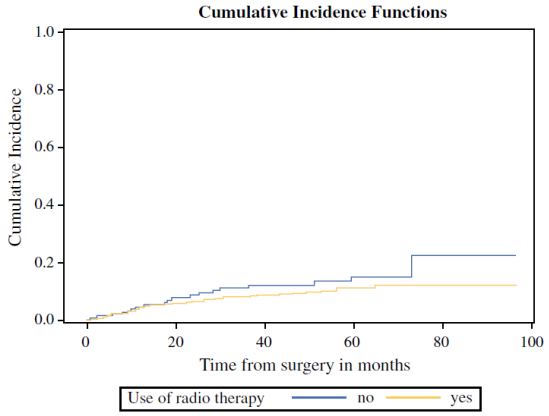


**FIG. 2** Kaplan–Meier plot for cumulative incidence of locoregional recurrence

clinical practice. In the absence of those data, there is currently insufficient evidence for routine omission of adjuvant RT in patients with cT3/4 tumors or clinically involved lymph nodes.[11,27,35] In patients with cT1–2 cN+ who become ypN0 or have pCR after NACT, the benefit and risk of RT should be discussed based on the individual recurrence risk for each patient.

Table 1 (*continued*)

| Parameter | Category | N | valid % |
|---|---|---|---|
| | GeparTRIO | 2072 | 20.6 |
| | GeparQUATTRO | 1495 | 14.8 |
| | PREPARE | 733 | 7.3 |
| | TECHNO | 217 | 2.2 |
| | GeparQuinto | 2572 | 25.5 |
| | GeparSixto | 588 | 5.8 |
| | GeparSepto | 1206 | 12.0 |

## Pooled Analysis

- La irradiación ganglionar disminuye la recidiva locoregional
- Las jóvenes, la afectación ganglionar, el G3 y el subtipo TN tienen peor pronóstico

European Journal of Cancer 130 (2020) 92–101

Available online at www.sciencedirect.com
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journal homepage: www.ejcancer.com

ELSEVIER

EJC

Original Research

# Locoregional recurrence risk after neoadjuvant chemotherapy: A pooled analysis of nine prospective neoadjuvant breast cancer trials☆,☆☆

Gustavo Werutsky [a,b,1], Michael Untch [c,1], Claus Hanusch [d], Peter A. Fasching [e], Jens-Uwe Blohmer [f], Sabine Seiler [a], Carsten Denkert [g], Hans Tesch [h], Christian Jackisch [i], Bernd Gerber [j], Andreas Schneeweiss [k], Theresa Link [l], David Krug [m], Jens Huober [n], Kerstin Rhiem [o], Thorsten Kühn [p], Valentina Vladimirova [a], Valentina Nekljudova [a], Sibylle Loibl [a,*]

national and international guidelines. The indication for radiotherapy was mainly based on clinical tumour and nodal stages, as well as age, lymphovascular invasion, margin status and presence of inflammatory signs. Indication for regional nodal irradiation was mainly based on nodal stage and, to a lesser part, tumour location (in regard to internal mammary node irradiation). Patients with oestrogen receptor (ER)- and/or

Therefore, there is a need to investigate whether current recommendations for post-mastectomy radiotherapy are applied after NACT, considering baseline clinicopathological factors and pCR status.

In conclusion, this pooled analysis demonstrated that young age, node-positive and G3 tumours, as well as TNBC and non-pCR increased significantly the risk of LRR as first event after NACT. Hence, there is a clear need to investigate better multimodality therapies in the post-neoadjuvant setting for high-risk patients.

Annals of Oncology 27: 818–827, 2016
doi:10.1093/annonc/mdw046
Published online 9 February 2016

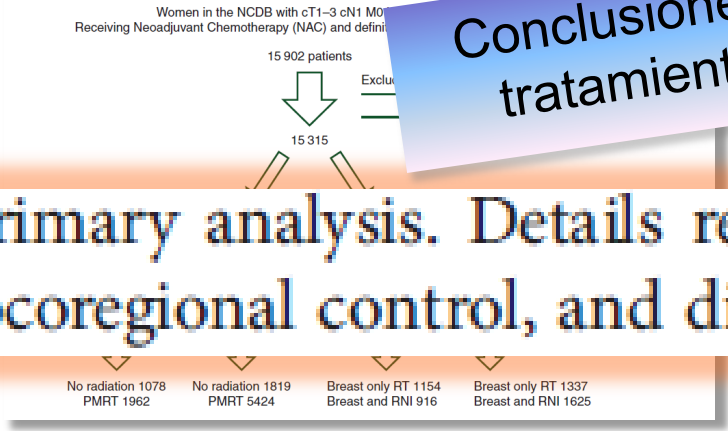
# The impact of postmastectomy and regional nodal radiation after neoadjuvant chemotherapy for clinically lymph node-positive breast cancer: a National Cancer Database (NCDB) analysis

C. G. Rusthoven[1]*, R. A. Rabinovitch[1], B. L. Jones[1], M. Koshy[2,3], A. Amini[1], N. Yeh[1], M. W. Jackson[1] & C. M. Fisher[1]

This retrospective analysis has several important limitations.

Conclusiones sin conocer el tratamiento administrado

primary analysis. Details regarding RNI fields and techniques, locoregional control, and disease-free survival were unavailable.



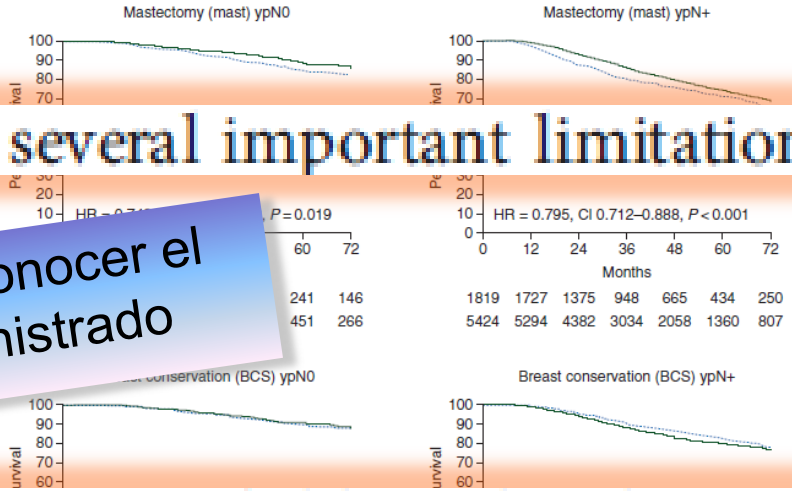




**Figure 2.** Kaplan–Meier survival curves. RT, radiotherapy; PMRT, postmastectomy radiotherapy; RNI, regional nodal irradiation; ypN, post-chemotherapy pathologic lymph node stage; ypN+, pathologically lymph node-positive; ypN0, pathologically lymph node-negative; Mast, Mastectomy; BCS, breast-conserving surgery.

Published Ahead of Print on August 18, 2014 as 10.1200/JCO.2014.56.5838
The latest version is at http://jco.ascopubs.org/cgi/doi/10.1200/JCO.2014.56.5838

JOURNAL OF CLINICAL ONCOLOGY ORIGINAL REPORT

ORIGINAL ARTICLES

## Locoregional Recurrence After Sentinel Lymph Node Dissection With or Without Axillary Dissection in Patients With Sentinel Lymph Node Metastases

*The American College of Surgeons Oncology Group Z0011 Randomized Trial*

*Armando E. Giuliano, MD,* Linda McCall, MS,† Peter Beitsch, MD,‡ Pat W. Whitworth, MD,§ Peter Blumencranz, MD,¶ A. Marilyn Leitch, MD,‖ Sukamal Saha, MD,** Kelly K. Hunt, MD,†† Monica Morrow, MD,‡‡ and Karla Ballman, PhD§§*


**Background and Objective:** Sentinel lymph node dissection (SLND) has eliminated the need for axillary dissection (ALND) in patients whose sentinel node (SN) is tumor-free. However, completion ALND for patients with tumor-involved SNs remains the standard to achieve locoregional control. Five studies…

Sentinel lymph node dissection (SLND) has revolutionized the management of clinically node-negative women with breast cancer. Single institutional studies, multi-institutional studies, and prospective randomized trials have shown the safety of omitting…y lymph node dissection (ALND) for women whose sentinel …SN) is free of metastatic disease.[1-3] The recommended man…nt, however, of the patient with SN metastases has continued …completion ALND. ALND is advised because of its excellent …l control and potential impact on survival. Completion …for women with micrometastases or isolated tumor cells …is especially controversial because of the uncertain clinical …cance of micrometastases and the low yield of additional …e axillary lymph nodes. However, most consensus statements …ing one from the American Society of Clinical Oncology …mend ALND for patients whose SN contains macrometasta…Cs, or micrometastases.[4,5]

A number of reports have suggested that selected patients …N metastasis may be managed without completion ALND.[6-8] …ver, most of these reports are small, single-institutional studies …ding patients whose SN demonstrated primarily micrometas…r ITCs. The American College of Surgeons Oncology Group …OG) Z0011 trial entitled "A randomized trial of axillary node …ion in women with clinical T1 or T2 N0 M0 breast cancer …ave a positive sentinel node" was designed to compare …es of patients whose hematoxylin and eosin (H and E)-…d SN metastases were treated with completion ALND or …ed without completion ALND and without third field axillary …n. The primary end point of the study was overall survival. …gh locoregional recurrence was not a prespecified secondary …int, the study did have a prespecified plan for monitoring …l recurrence, reflecting concern that regional recurrence rate …be unacceptably high without completion ALND. Thus, locoregional control was assessed to determine the effect of ALND and SLND in contemporary women managed with breast-conserving surgery, adjuvant systemic therapy, and opposing tangential field whole breast irradiation. The locoregional recurrence rates seen in this study and the effect of the extent of operation on locoregional control provide important information regarding the management of the axilla for patients with early breast cancer.

### STUDY DESIGN AND METHODS

All participants were women at least 18 years of age with clinical T1 or T2 N0 M0 breast cancer treated with SLND and breast-conserving therapy as previously described.[9] Lumpectomy margins were required to be negative for study participation. Planned mastectomy was not permitted. Patients must have undergone SLND within 60 days of the diagnosis of invasive breast carcinoma and have an Eastern Cooperative Oncology Group

From the *John Wayne Cancer Institute at Saint John's Health Center, Santa Monica, CA; †American College of Surgeons Oncology Group, Durham, NC; ‡Dallas Surgical Group, Dallas, TX; §Nashville Breast Center, Nashville, TN; ¶Morton Plant Hospital, Clear Water, FL; ‖University of Texas Southwestern Medical Center, Dallas, TX; **McLaren Regional Medical Center, Michigan State University, Flint, MI; ††M.D. Anderson Cancer Center, Houston, TX; ‡‡Memorial Sloan Kettering Cancer Center, New York City, NY; and §§Mayo Clinic, Rochester, MN.

Supported by federal funds from the National Institutes of Health, under the Grant entitled "American College of Surgeons Oncology Group."
This study has been registered at ClinicalTrials.gov and carries the identifier NCT00003855.
The content is solely the responsibility of the authors and does not necessarily represent the official view of the National Institutes of Health.
Reprints: Armando E. Giuliano, MD, John Wayne Cancer Institute, 2200 Santa Monica Blvd, Santa Monica, CA 90404. E-mail: giulianoa@jwci.org.

ISSN: 0003-4932/10/25203-0426
DOI: 10.1097/SLA.0b013e3181f8f8f2

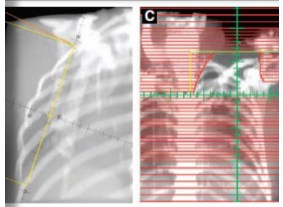




Radiation Field Design in the ACO… (Alliance) Trial

*Reshma Jagsi, Manjeet Chadha, Janaki Moni, Karla Ballman, Fr… Armando Giuliano, and Bruce G. Haffty*

50
+18,9
68,9



…del 50% high tar…

- 18,9% irradiación de la supraclavicular

ORIGINAL CONTRIBUTION

## Axillary Dissection vs No Axillary Dissection in Women With Invasive Breast Cancer and Sentinel Node Metastasis

A Randomized Clinical Trial

Armando E. Giuliano, MD
Kelly K. Hunt, MD
Karla V. Ballman, PhD
Peter D. Beitsch, MD
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A. Marilyn Leitch, MD
Sukamal Saha, MD
Linda M. McCall, MS
Monica Morrow, MD

AXILLARY LYMPH NODE DISSECTION (ALND) has been part of breast cancer surgery since the description of the radical mastectomy.[1] ALND reliably identifies nodal metastases and maintains regional control,[2,3] but the contribution of local therapy to breast cancer survival is controversial.[4,5] The Early Breast Cancer Trialists' Collaborative Group synthesized findings from 78 randomized controlled trials, concluding that local control of breast cancer was associated with improved disease-specific survival.[5]

ALND, as a means for achieving local disease control, carries an indisputable and often unacceptable risk of complications such as seroma, infection, and lymphedema.[7-9] Sentinel lymph node dissection (SLND) was therefore developed to accurately stage tumor-draining axillary nodes with less morbidity than ALND.[10] SLND alone is the accepted management for patients whose

**Context** Sentinel lymph node dissection (SLND) accurately identifies nodal metastasis of early breast cancer, but it is not clear whether further nodal dissection affects survival.

**Objective** To determine the effects of complete axillary lymph node dissection (ALND) on survival of patients with sentinel lymph node (SLN) metastasis of breast cancer.

**Design, Setting, and Patients** The American College of Surgeons Oncology Group Z0011 trial, a phase 3 noninferiority trial conducted at 115 sites and enrolling patients from May 1999 to December 2004. Patients were women with clinical T1-T2 invasive breast cancer, no palpable adenopathy, and 1 to 2 SLNs containing metastases identified by frozen section, touch preparation, or hematoxylin-eosin staining on permanent section. Targeted enrollment was 1900 women with final analysis after 500 deaths, but the trial closed early because mortality rate was lower than expected.

**Interventions** All patients underwent lumpectomy and tangential whole-breast irradiation. Those with SLN metastases identified by SLND were randomized to undergo ALND or no further axillary treatment. Those randomized to ALND underwent dissection of 10 or more nodes. Systemic therapy was at the discretion of the treating physician.

**Main Outcome Measures** Overall survival was the primary end point, with a noninferiority margin of a 1-sided hazard ratio of less than 1.3 indicating that SLND alone is noninferior to ALND. Disease-free survival was a secondary end point.

**Results** Clinical and tumor characteristics were similar between 445 patients randomized to ALND and 446 randomized to SLND alone. However, the median number of nodes removed was 17 with ALND and 2 with SLND alone. At a median follow-up of 6.3 years (last follow-up, March 4, 2010), 5-year overall survival was 91.8% (95% confidence interval [CI], 89.1%-94.5%) with ALND and 92.5% (95% CI, 90.0%-95.1%) with SLND alone; 5-year disease-free survival was 82.2% (95% CI, 78.3%-86.3%) with ALND and 83.9% (95% CI, 80.2%-87.9%) with SLND alone. The hazard ratio for treatment-related overall survival was 0.79 (90% CI, 0.56-1.11) without adjustment and 0.87 (90% CI, 0.62-1.23) after adjusting for age and adjuvant therapy.

**Conclusion** Among patients with limited SLN metastatic breast cancer treated with breast conservation and systemic therapy, the use of SLND alone compared with ALND did not result in inferior survival.

**Trial Registration** clinicaltrials.gov Identifier: NCT00003855

*JAMA. 2011;305(6):569-575* www.jama.com

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Corresponding Author: Armando E. Giuliano, MD, John Wayne Cancer Institute at Saint John's Health Center, 2200 Santa Monica Blvd, Santa Monica, CA 90404 (giulianoa@jwci.org).



For editorial comment see p 606.

frontiers in Oncology
REVIEW
published: 04 April 2018
doi: 10.3389/fonc.2018.00084

# Management of the Axilla in the Era of Breast Cancer Heterogeneity

*Maïlys de Meric de Bellefon[1], Claire Lemanski[1], Angélique Ducteil[1], Pascal Fenoglietto[1], David Azria[1,2,3] and Celine Bourgier[1,2,3]**

[1] Institut Régional du Cancer de Montpellier (ICM), Montpellier, France, [2] Institut de Recherche en Cancérologie de Montpellier (IRCM), INSERM U1194, Montpellier, France, [3] Université de Montpellier, Montpellier, France*

Radiotherapy and Oncology 122 (2017) 37–44

Contents lists available at ScienceDirect

Radiotherapy and Oncology

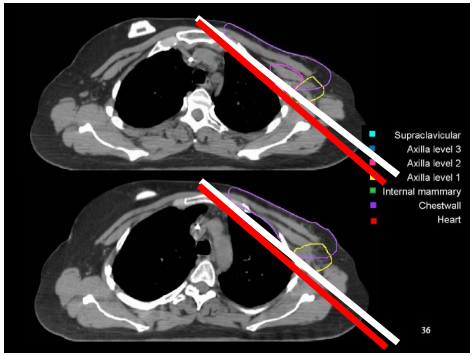
journal homepage: www.thegreenjournal.com

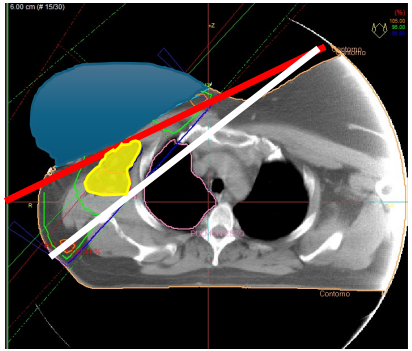
Breast radiotherapy

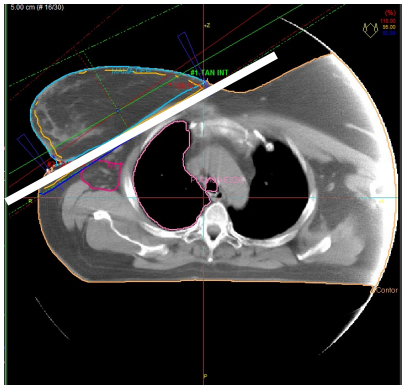
# Ipsilateral axillary recurrence after breast conservative surgery: The protective effect of whole breast radiotherapy

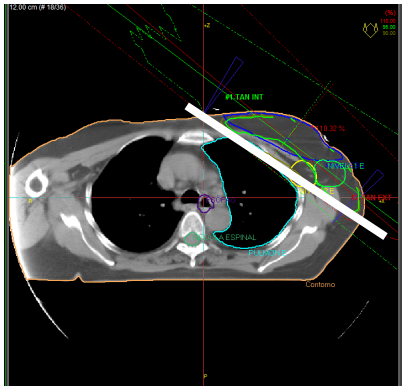
Oreste Gentilini [a,*,1], Edoardo Botteri [b], Maria Cristina Leonardi [c], Nicole Rotmensz [b], Jose Vila [a], Nickolas Peradze [a], Maria Virginia Thomazini [a], Barbara Alicja Jereczek [c,d], Viviana Galimberti [a], Alberto Luini [a], Paolo Veronesi [a,b,c,d], Roberto Orecchia [c,d]

*[a] Breast Surgery Division; [b] Epidemiology and Biostatistics Division; [c] Radiotherapy Division, European Institute of Oncology, Milano; [d] University of Milan, European Institute of Oncology; and * Scientific Directorate, European Institute of Oncology, Milano, Italy*




**Con los campos tangenciales se puede irradiar algo de la axila**

**El beneficio es por la Irradiación incidental?**

Algara López et al. Radiat Oncol (2020) 15:229
https://doi.org/10.1186/s13014-020-01672-7

Radiation Oncology

STUDY PROTOCOL Open Access

# OPTimizing Irradiation through Molecular Assessment of Lymph node (OPTIMAL): a randomized open label trial

Manuel Algara López[1*], Elvira Rodríguez García[2], Inmaculada Beato Tortajada[3], Francisco José Martínez Arcelus[4], Juan Salinas Ramos[5], José Reyes Rodríguez garrido[6], Xavier Sanz Latiesas[7], Ana Soler Rodríguez[8], Germán Juan Rijo[9] and Amanda Flaquer García[10]

Radiotherapy and Oncology 176 (2022) 76–82

Contents lists available at ScienceDirect

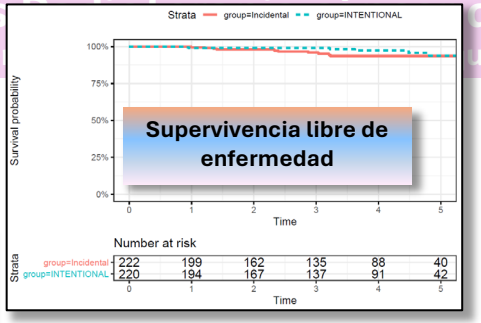
Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com

Original Article

# OPTimizing Irradiation through Molecular Assessment of Lymph node (OPTIMAL): a randomized clinical trial

Manuel Algara [a,*], Elvira Rodríguez [b], Francisco José Martínez-Arcelus [c], Juan Salinas [d], Xavier Sanz [e], Inmaculada Beato [f], Aurea Manso [f], Ana Soler [g], José Reyes Rodríguez [h], Andere Frías [i], Ana Calín [j], Germán Juan [k], Pedro Meireles [l], Amanda Flaquer [m], on behalf of the OPTIMAL investigators



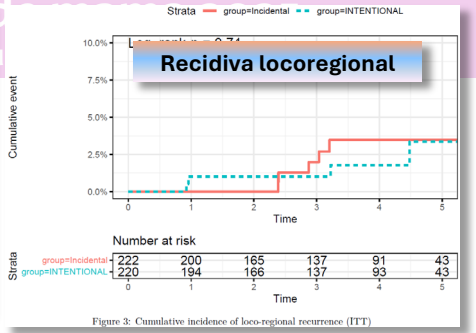




Figure 3: Cumulative incidence of loco-regional recurrence (ITT)

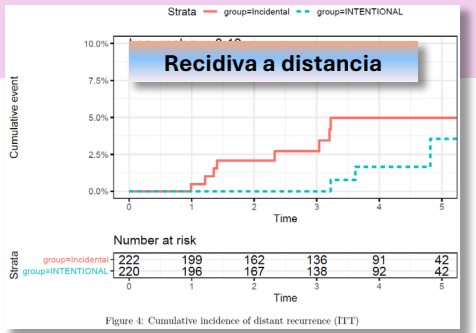



Figure 4: Cumulative incidence of distant recurrence (ITT)

**No es necesaria la irradiación de todos los volúmenes ganglionares en caso de baja carga tumoral axilar**

**Table 3**
Mean dose received by volume. *Referred to patients that received "boost", 141 and 135 patients in the intentional and incidental irradiation groups, respectively.

| | Intentional irradiation (N = 220) | Incidental irradiation (N = 222) |
|---|---|---|
| Breast (Gy), mean (SD) | 49.8 (4.8) | 50.2 (4.7) |
| Tumor bed (Gy), mean (SD)* | 59.4 (6.64) | 59.6 (6.62) |
| Axillary level 1 (Gy), mean (SD) | 48.0 (4.6) | 31.3 (13.4) |
| Axillary level 2 (Gy), mean (SD) | 47.5 (6.0) | 20.3 (15.3) |
| Axillary level 3 (Gy), mean (SD) | 47.6 (7.6) | 9.1 (11.2) |
| Supraclavicular (Gy), mean (SD) | 50.0 (8.4) | 1.0 (8.4) |
| Internal mammary chain (Gy), mean (SD) | 24.3 (14.6) | 19.8 (13.2) |

**Las dosis recibidas en los niveles I, II son importantes**

Radiotherapy and Oncology 191 (2024) 110069

Contents lists available at ScienceDirect

Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com

Original Article

# Quality assurance of radiation therapy after breast-conserving surgery among patients in the BOOG 2013-08 trial

V.M. Wintraecken [a,b,*], L.J. Boersma [c], L.M. van Roozendaal [d], J. de Vries [e,f], S.M.J. van Kuijk [g], M.L.G. Vane [a,b], T. van Dalen [h,i], J.A. van der Hage [j], L.J.A. Strobbe [k], S.C. Linn [l], M.B. I. Lobbes [a,m,n], P.M.P Poortmans [o,p], V.C.G. Tjan-Heijnen [a,q], K.K.B.T. van de Vijver [r,s,t], A. H. Westenberg [u], J.H.W. de Wilt [v], M.L. Smidt [a,b], J.M. Simons [a,w], on behalf of the BOOG 2013-08 group

**Table 3**
Dose volume parameters of the planning target volumes in a subselection of BOOG 2013-08 participants.

| Parameter | Overall N = 326 | SLNB arm (pN- and pN + ) N = 148 | No-SLNB arm N = 178 | *P-value* |
|---|---|---|---|---|
| **Breast** | | | | |
| Mean dose in Gy, mean; SD (range) | 44.1; 3.7 (28.5 – 56.5) | 44.4; 3.4 (39.3 – 56.5) | 43.8; 4.0 (28.5 – 55.8) | 0.195 |
| | 102.5; 4.1 (96.9 – 125.5)* | 102.7; 4.2 (98.1 – 124.1)* | 102.3; 3.9 (96.9 – 125.5)* | 0.189 |
| o percentage of prescribed breast dose, mean; SD (range) | 98.1; 1.7 (89 – 100) | 98.4; 1.3 (91 – 100) | 97.8; 1.9 (89 – 100) | **0.002** |
| V95%, mean (%); SD (range) | | | | |
| **Axillary level I** | 25.6; 8.8 (2.5 – 46.1) | 26.3; 8.8 (5.1 – 46.1) | 25.0; 8.9 (2.5 – 45.6) | |
| Mean dose in Gy, mean; SD (range) | 59.5; 19.9 (5.9 – 101.2) | 60.8; 19.6 (12.0 – 101.2) | 58.4; 20.1 (5.9 – 100.1) | 0.294 |
| | 31.1; 18.1 (0 – 87) | 33.4; 19.1 (0—84) | 29.3; 17.1 (0 – 87) | 0.449 |
| o percentage of prescribed dose, mean; SD (range) | N = 0 | N = 0 | N = 0 | 0.198 |
| | N = 3 (0.9 %) | N = 2 (1.4 %) | N = 1 (0.6 %) | |
| V95%, mean (%); SD (range) | N = 46 (14.1 %) | N = 28 (18.9 %) | N = 18 (10.1 %) | |
| | 58.2; 21.3 (7–100) | 59.2; 21.1 (8–97) | 57.4; 21.5 (7–100) | 0.663 |
| | N = 11 (3.4 %) | N = 6 (4.1 %) | N = 5 (2.8 %) | |
| o V95% >= 95 % | N = 51 (15.6 %) | N = 23 (15.5 %) | N = 28 (15.7 %) | |
| o V95% >= 80 % | N = 159 (48.8 %) | N = 74 (50.0 %) | N = 85 (47.8 %) | |
| o V95% >= 50 % | | | | |
| V50%, mean (%); SD (range) | | | | |
| o V50% >= 95 % | | | | |
| o V50% >= 80 % | | | | |
| o V50% >= 50 % | | | | |
| **Axillary level II** | | | | |
| Mean dose in Gy, mean; SD (range) | 14.8; 8.2 (1.3 – 51.0) | 15.9; 8.1 (1.3 – 51.0) | 13.9; 8.2 (1.4 – 36.0) | 0.075 |
| | 34.4; 19.1 (3 – 119.7) | 36.8; 18.6 (3.1 – 119.7) | 32.5; 19.3 (3.0 – 83.4) | 0.091 |

La dosis incidental en el nivel I axilar no es despreciable, equivale al 60% de la dosis prescrita

Radiotherapy and Oncology 199 (2024) 110429

Contents lists available at ScienceDirect

Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com

# Reporting breast cancer radiation therapy details in studies and daily practice: Nice-to-have or a must-have?

Liesbeth J. Boersma[a,*], Nina Bijker[b], Marcel R. Stam[c]

## Conclusion

Reporting of RT details in studies is *a must-have,* and reporting of RT details in daily clinical practice is *(very) nice-to-have, and essential to give an accurate insight into the quality of the given treatment.* (Automatic) collection of raw DICOM data is strongly recommended, has been shown to be feasible for several purposes, and offers a goldmine of data for real-world research!

Hay que describir la radioterapia realizada

Se recomienda registrarla de forma automatizada (DICOM)

# Todos demuestran beneficio con la irradiación

VOLUME 22 · NUMBER 23 · DECEMBER 1 2004
JOURNAL OF CLINICAL ONCOLOGY ORIGINAL REPORT

## Postmastectomy Radiation Improves Local-Regional Control and Survival for Selected Patients With Locally Advanced Breast Cancer Treated With Neoadjuvant Chemotherapy and Mastectomy

*Eugene H. Huang, Susan L. Tucker, Eric A. Strom, Marsha D. McNeese, Henry M. Kuerer, Aman U. Buzdar, Vicente Valero, George H. Perkins, Naomi R. Schechter, Kelly K. Hunt, Aysegul A. Sahin, Gabriel N. Hortobagyi, and Thomas A. Buchholz*

From the Departments of Radiation Oncology, Biomathematics, Surgical Oncology, Breast Medical Oncology, and

A B S T R A C T

Int. J. Radiation Oncology Biol. Phys., Vol. 68, No. 4, pp. 1004–1009, 2007
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0360-3016/07/$–see front matter

ELSEVIER

doi:10.1016/j.ijrobp.2007.01.023

CLINICAL INVESTIGATION Breast

## POSTMASTECTOMY RADIATION IMPROVES THE OUTCOME OF PATIENTS WITH LOCALLY ADVANCED BREAST CANCER WHO ACHIEVE A PATHOLOGIC COMPLETE RESPONSE TO NEOADJUVANT CHEMOTHERAPY

SEAN E. MCGUIRE, M.D., PH.D.,* ANA M. GONZALEZ-ANGULO, M.D.,† EUGENE H. HUANG, M.D.,* SUSAN L. TUCKER, PH.D.,‡ SHU-WAN C. KAU, PH.D.,† TSE-KUAN YU, M.D., PH.D.,* ERIC A. STROM, M.D.,* JULIA L. OH, M.D.,* WENDY A. WOODWARD, M.D., PH.D.,* WELELA TEREFFE, M.D.,* KELLY K. HUNT, M.D.,§ HENRY M. KUERER, M.D., PH.D.,§ AYSEGUL A. SAHIN, M.D.,‖ GABRIEL N. HORTOBAGYI, M.D.,† AND THOMAS A. BUCHHOLZ, M.D.*

Departments of *Radiation Oncology, †Breast Medical Oncology, ‡Biostatistics and Applied Mathematics, §Surgical Oncol... ‖Pathology, The University of Texas M. D. Anderson Cancer Center, Houston...

www.impactjournals.com/oncotarget/ Oncotarget, Vol. 7, No. 17

## The role of postmastectomy radiotherapy in clinically node-positive, stage II-III breast cancer patients with pathological negative nodes after neoadjuvant chemotherapy: an analysis from the NCDB

**Jieqiong Liu[1,2,*], Kai Mao[3,4,*], Shuai Jiang[5], Wen Jiang[6], Kai Chen[1,2], Betty Y.S. Kim[7], Qiang Liu[1] and Lisa K. Jacobs[2]**

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[5] Department ... y, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA
... ncology, MD Anderson Cancer Center, Houston, TX, USA
... Surgery, Mayo Clinic Florida, Jacksonville, FL, USA
... ted equally to this work
... bbs, **email:** ljacob14@jhmi.edu
... , **email:** liujieqion01@hotmail.com

... astectomy radiotherapy, complete pathological nodal response, neoadjuvant chemotherapy,

**Accepted:** November 26, 2015 **Published:** December 18, 2015

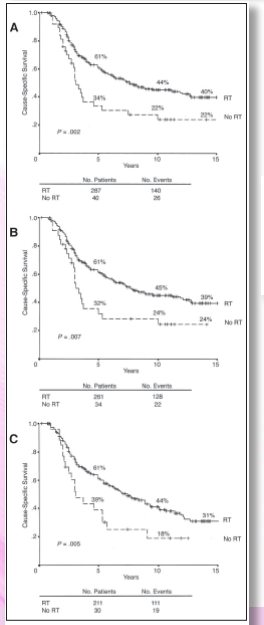



Fig 3. (A) Rate of cause-specific survival for patients with clinical stage IIIB to stage IV disease treated with radiation (RT) and without radiation (No RT). (B) Rate of cause-specific survival for patients with clinical T4 tumors treated with RT and without. (C) Rate of cause-specific survival for patients with four or more positive nodes treated with and without RT.

In conclusion, postmastectom... portant role in the management of ... adjuvant chemotherapy and ma... advanced breast cancer. Radiation ... both local control and survival in pa... presenting with clinical T3 tumors or stage III to stage IV disease, and in patients with four or more positive nodes after chemotherapy.

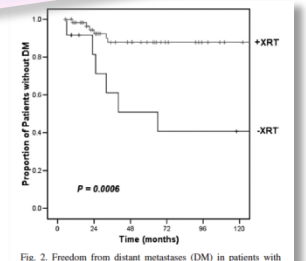



Fig. 2. Freedom from distant metastases (DM) in patients with clinical Stage III breast cancer treated with neoadjuvant chemotherapy and mastectomy with or without radiation therapy (+XRT and −XRT, respectively).

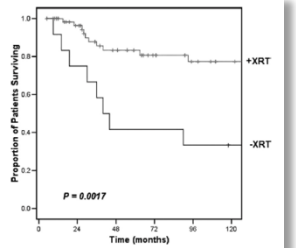



Fig. 3. Overall survival in patients with Stage III breast cancer treated with neoadjuvant chemotherapy and mastectomy with or without radiation therapy (+XRT and −XRT, respectively).

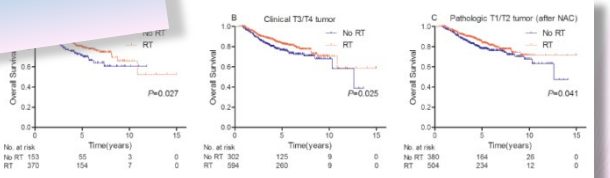
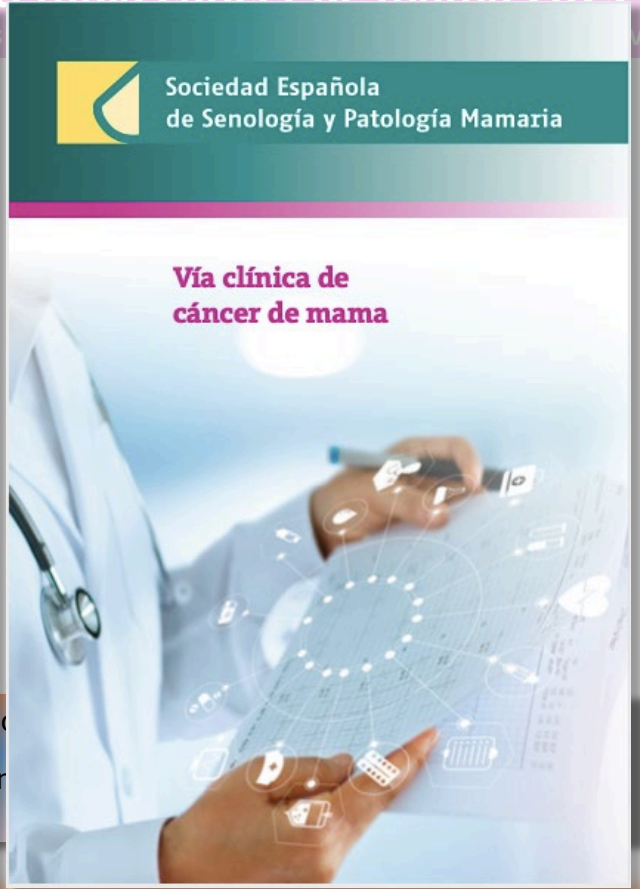
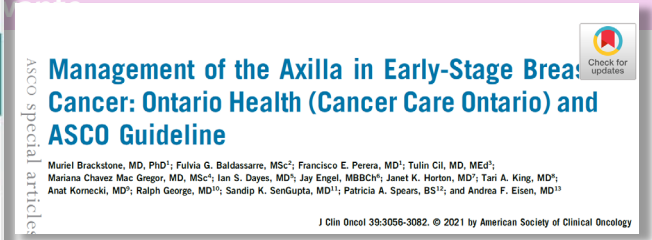



**Figure 2: Rate of overall survival for patients with A.** clinical IIIB/IIIC disease, **B.** clinical T3/T4 tumor, or **C.** pathologic T1/T2 tumor after NAC who were treated with PMRT and with and without PMRT.

## CONCLUSIONS

In conclusion, we provided important evidence that among clinically node-positive, stage II-III breast cancer patients with ypN0 following NAC, PMRT can improve overall survival in patients with clinical T3/T4 tumor or stage IIIB/IIIC disease, and in patients with residual invasive breast tumor after NAC. Our study may help oncologists to recommend PMRT for selected patients who downstaged to ypN0 following NAC. Results from further prospective studies such as the ongoing NSABP B-51 trial are needed, in order to confirm our findings and define other specific subgroups of women with pathological negative nodes following NAC who would benefit from PMRT, particularly in the relatively low-risk patients.



ASCO special articles

Check for updates

**Management of the Axilla in Early-Stage Breast Cancer: Ontario Health (Cancer Care Ontario) and ASCO Guideline**

Muriel Brackstone, MD, PhD[1]; Fulvia G. Baldassarre, MSc[2]; Francisco E. Perera, MD[1]; Tulin Cil, MD, MEd[3]; Mariana Chavez Mac Gregor, MD, MSc[4]; Ian S. Dayes, MD[5]; Jay Engel, MBBCh[6]; Janet K. Horton, MD[7]; Tari A. King, MD[8]; Anat Kornecki, MD[9]; Ralph George, MD[10]; Sandip K. SenGupta, MD[11]; Patricia A. Spears, BS[12]; and Andrea F. Eisen, MD[13]

J Clin Oncol 39:3056-3082. © 2021 by American Society of Clinical Oncology

**Recommendation 4**

*(A) Initially node-negative patients*

- Patients who are initially clinically node-negative on physical examination, and those who had clinically suspicious nodes on physical examination but deemed to be pathologically negative at fine needle aspiration or core needle biopsy, and were treated with NAC should receive SLNB at the time of surgery as their axillary staging procedure (Type: informal consensus; benefits outweigh harms; Evidence quality: insufficient; Strength of recommendation: strong).

*(B) Initially node-positive patients*

- For patients who were initially clinically and biopsy-proven node-positive, and who remained clinically node-positive after NAC, we recommend ALND.
- For patients who were initially clinically and biopsy-proven node-positive, and became node-negative after NAC, we recommend SLNB to restage the axilla. Restaging can be achieved by placing a biopsy clip into the biopsied positive node at diagnosis and localizing it at surgery along with sentinel node biopsy or, in institutions where the use of biopsy clips for nodes is not available, by performing sentinel node biopsy with dual tracer and excising at least three sentinel nodes to minimize the false-negative rate (FNR) and optimize accuracy of the procedure. At this time, we also recommend LRNI for these patients, regardless of pathologic status of sentinel lymph nodes.
- Postmastectomy patients who are node-positive on surgical pathology after NAC can be offered PMRT after a completion ALND.
- We recommend LRNI for the postmastectomy node-positive cohort after NAC while awaiting data from ongoing trials (ie, the MAC19 study).
- We recommend LRNI after ALND for patients clinically and biopsy-proven node-positive at breast-conserving surgery who remain pathologically node-positive after NAC.
- Shared decision-making processes should be put in place while we await mature clinical trial data, to enable patient value-based decision making.

(Type: evidence based; benefits outweigh harms; Evidence quality: low; Strength of recommendation: weak.)

Inicial N-: No tratamiento

Inicial N+ N+: Linfadenectomía + Irradiación

Inicial N+ N-: Irradiación ganglionar

En caso de irradiación tras tratamiento sistémico primario se decidirá en función de la peor estadificación, previa o final en caso de progresión. En caso de dudas valorar en función de factores de riesgo, edad, receptores hormonales, KI, infiltración linfovascular.

| Antes | Después | Radioterapia |
|---|---|---|
| Ganglios positivos clínicos o histológicos | Linfadenectomía negativa | **Si** |
| | Linfadenectomía positiva | **Si** |
| | | |
| | | |
| Ganglios negativos clínicos (ecografia) | | |
| | | |
| | BSGC positiva → Linfadenectomía | **Si** |
| | BSGC negativa | **No** (excepto T4) |

Annals of Oncology

original articles

*Annals of Oncology* 26: 529–535, 2015
doi:10.1093/annonc/mdu561
Published online 5 December 2014

## Patterns of practice of regional nodal irradiation in breast cancer: results of the European Organization for Research and Treatment of Cancer (EORTC) NOdal Radiotherapy (NORA) survey†

Y. Belkacemi[1,2*], O. Kaidar-Person[2,3], P. Poortmans[4], M. Ozsahin[2,5], M-C. Valli[6], N. Russell[7], I. Kunkler[8], J. Hermans[9], A. Kuten[2,3,10], G. van Tienhoven[11] & H. Westenberg[12], on behalf of the Breast Working Party of the EORTC Radiation Oncology Group (ROG)

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| | n | % |
|---|---|---|
| Yes | 63 | 75 |
| No | 21 | 25 |
| Decision for nodal RT according to post-operative fibrotic scars in pN0 patients | | |
| Yes | 49 | 58 |
| No | 35 | 25 |
| Decision for nodal RT in pN0 patients with an unknown pre-PST nodal status | | |
| Yes | 59 | 70 |
| No | 25 | 30 |
| Decision for nodal RT in proven pN0 pre-PST nodal status | | |
| Yes | 17 | 20 |
| No | 67 | 80 |

Decision for nodal RT in after PST

| Volumes | SCN-RT (*n*) | IMC-RT (*n*) | ALN-RT (*n*) |
|---|---|---|---|
| ypN0 BUT inner or central tumors | 23 (27%) | 32 (38%) | — |
| ypN0i+ | 22 (26%) | 6 (7%) | — |
| ypNmi | 30 (36%) | 8 (10%) | — |
| ypN+ (1N+) | 44 (52%) | 12 (14%) | 21 (25%) |
| ypN+ (2N+) | 58 (69%) | 15 (18%) | |
| ypN+ (≥ 3N+) | 67 (80%) | 26 (31%) | 34 (40%) |

75% RXT si cN1
70% RXT si cN?
20% RXT si cNo

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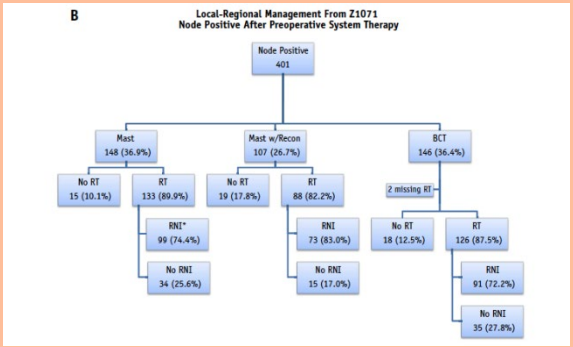
Clinical Investigation

## Patterns of Local-Regional Management Following Neoadjuvant Chemotherapy in Breast Cancer: Results From ACOSOG Z1071 (Alliance)

Bruce G. Haffty, MD,* Linda M. McCall, MS,† Karla V. Ballman, PhD,‡ Sarah McLaughlin, MD,‖ Reshma Jagsi, MD,‖ David W. Ollila, MD,¶ Kelly K. Hunt, MD,# Thomas A. Buchholz, MD,** and Judy C. Boughey, MD††

**Department of Radiation Oncology, Rutgers Cancer Institute of New Jersey, New Brunswick, New Jersey; †Alliance Statistics and Data Center, Duke University, Durham, North Carolina; ‡Weill Medical College of Cornell University, New York, New York; ‖Mayo Clinic, Jacksonville, Florida; ¶University of Michigan, Ann Arbor, Michigan; #University of North Carolina, Chapel Hill, North Carolina; **Department of Breast Surgical Oncology, MD Anderson Cancer Center, Houston, Texas; ††MD Anderson Cancer Center, Houston, Texas; and ‡‡Mayo Clinic, Rochester, Minnesota*

Received Sep 30, 2015, and in revised form Oct 31, 2015. Accepted for publication Nov 3, 2015.




72-87% RXT si cN1
50-78% RXT si cN0

Clin Transl Oncol
DOI 10.1007/s12094-015-1401-0

RESEARCH ARTICLE

## The position and current status of radiation therapy after primary systemic therapy in breast cancer: a national survey-based expert consensus statement

M. Arenas[1] · Á. Montero[2] · M. D. de las Peñas[3] · M. Algara[4]

Received: 17 August 2015 / Accepted: 31 August 2015


64% RXT si cN1
83% RXT si cN1 (no ALND)

**Mucha variabilidad**

ROJ Radiation Oncology Journal

Original Article

pISSN 2234-1900 · eISSN 2234-3156
Radiat Oncol J 2024;42(4):308-318
https://doi.org/10.3857/roj.2024.00248

**Radiation therapy volumes after primary systemic therapy in breast cancer patients: an international EUBREAST survey**

Maria Luisa Gasparri[1,2,3,*], Orit Kaidar-Person[4,5,*], Oreste Davide Gentilini[6,7], Jana de Boniface[8,9], Thorsten Kuehn[10], Philip Poortmans[11,12]

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[10]
[11]
[12]

**Sigue existiendo mucha variabilidad**

Surgical changes in the axillary levels such as clips (often applied at the superior border of the dissection), seroma, and inflammatory changes and other post-surgical effects can be noted on the RT planning CT scan. Our survey show that many radiation oncologists take these surgical changes into account for planning RNI, understanding that even if an ALND was performed, such surgical changes may only be observed in level 1 (partial ALND). In such cases, level 2, retropectoral nodes and levels 3–4 should be targeted if RNI is indicated. However, some radiation oncologists stated that only levels 3–4 will be targeted after ALND, suggesting that either they have full confidence in the ALND procedure (which includes levels 1–2) or the volumes are according to the concept of the 2D era [33] where only a medial supra-clavicular field is applied after ALND.

Encuesta online con 39 preguntas sobre el manejo locorregional post-TSP.
17 países, 349 especialistas de los que 72 son oncólogos radioterápicos (20,6%).
**El 61,1% de ellos considera el estado ganglionar inicial como criterio para RNI**

**ypN+:** 59,7% siempre administran RNI.
36,1% si hay más de 3 macrometástasis.
4,1% no

**ypN1mi:** 62,5% RNI en lugar de linfadenectomía

**ypN0(i+):** 65,3% RNI en lugar de linfadenectomía.

- La irradiación de los niveles ganglionares 1 y 2 no está claramente definida como necesaria en todos los casos, especialmente después de una linfadenectomía axilar. Sin embargo, en caso de BSGC o TAD, se recomienda la irradiación de los niveles 1 y 2.
- No se recomienda usar cicatrices fibróticas como único criterio para indicar RNI

ARS ANNUAL MEETING

# Executive Summary of the American Radium Society Appropriate Use Criteria

## *Regional Nodal Irradiation for Breast Cancer*

*Expert Panel on Breast Cancer J. Isabelle Choi, MD,* Gary M. Freedman, MD,† David M. Guttmann, MD,‡ Kamran Ahmed, MD,§ Wendy Gao, MD,‖ Eleanor M. Walker, MD,¶ Eleanor E. Harris, MD,# Victor Gonzalez, MD,** Jason Ye, MD,†† Kevin Nead, MD,‡‡ Neil Taunk, MD,† Audree B. Tadros, MD,§§ Chau T. Dang, MD,‖‖ Parima Daroui, MD,¶¶ and Kristina Novick, MD##*

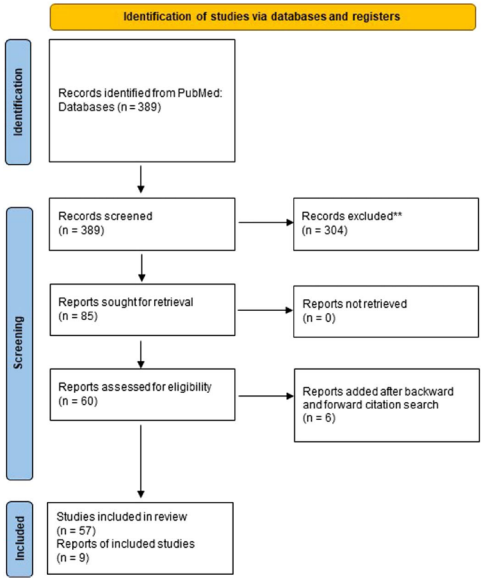



FIGURE 1. PRISMA diagram for literature search. PRISMA indicates preferred reporting items for systematic reviews and meta-analyses.

**pN0:** la mayoría no necesita RNI, puede considerarse en tumores mediales, G3, RRHH -, ILV

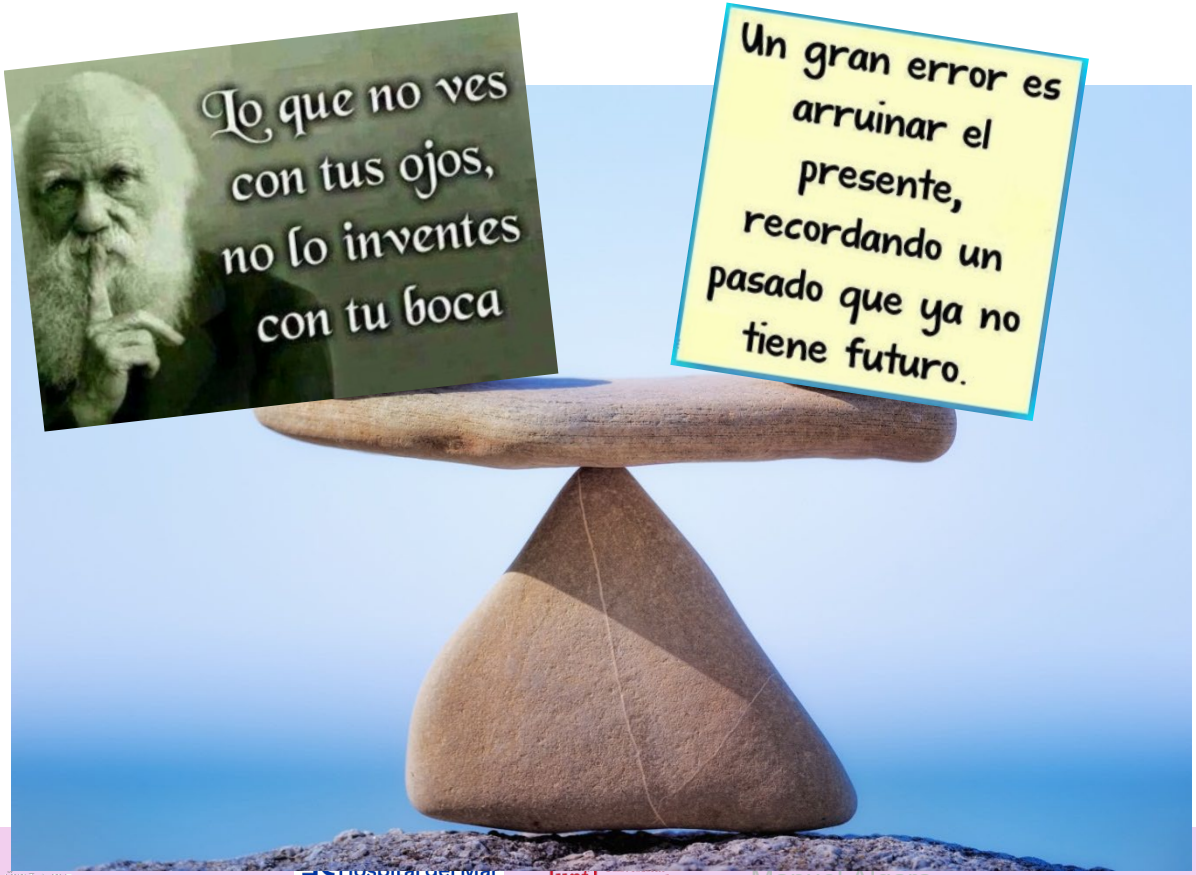
**1-3 +:** se recomienda en pacientes con factores de alto riesgo. Reduce la recurrencia locorregional y la mortalidad por cáncer de mama

**≥4 ganglios +**: altamente recomendada impacta en supervivencia en el control locorregional.

included in ALND, and the need for their inclusion in RNI is unclear, especially in the absence of risk factors like extracapsular extension and axillary soft tissue tumor deposits. WBRT fields often partially include these levels, making interpretation of trial data more challenging. Modern trials, including Alliance 011202 [NCT01901094], in which patients with pN+ disease receive RNI explicitly excluding the dissected axilla after ALND, and the RadComp trial [NCT02603341], in which dissected axilla inclusion is left to the provider's discretion, will continue to shed light on the impact of inclusion of this region in RNI. *Response to Neoadjuvant Chemotherapy*. Five-year results were recently presented of the NSABP B-51/RTOG 1304 phase III trial [NCT01872975] that enrolled 1641 patients achieving a complete nodal response after neoadjuvant chemotherapy (NAC) and surgery and randomizing to adjuvant RNI versus no RNI. There was no difference in the rate of invasive breast cancer-free recurrence interval (91.8% +RNI vs. 92.7% −RNI), distant recurrence, or OS.[42] Isolated LRR was 1.4% without RNI and 0.5% with RNI. Subgroup analyses demonstrated a greater absolute number of invasive breast cancer recurrence in several subsets.

En caso de ypN0 se remite al B51

**… parece que no mejora nada**


Lo que no ves con tus ojos, no lo inventes con tu boca
Un gran error es arruinar el presente, recordando un pasado que ya no tiene futuro.

VOLUME 30 · NUMBER 32 · NOVEMBER 10 2012

JOURNAL OF CLINICAL ONCOLOGY | ONCOLOGY GRAND ROUNDS

Should Response to Preoperative Chemotherapy Affect Radiotherapy Recommendations After Mastectomy for Stage II Breast Cancer?

Jennifer R. Bellon, Julia S. Wong, and Harold J. Burstein, *Dana-Farber Cancer Institute, Brigham and Women's Hospital, and Harvard Medical School, Boston, MA*

See accompanying editorial on page 3913 and article on page 3960

Ann Surg Oncol
DOI 10.1245/s10434-015-4406-6

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

CONTINUING EDUCATION– BREAST ONCOLOGY

**Impact of Neoadjuvant Chemotherapy o… Treatment of Breast Cancer**

Eleftherios P. Mamo…

Ann Surg Oncol
DOI 10.1245/s10434-015-4402-x

Annals of SURGICAL ONCOLOGY
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…NTINUING EDUCATION – BREAST ONCOLOGY

**…ence of Neoadjuvant Chemotherapy on Radiotherapy …reast Cancer**

…arg, MD and Thomas A. Buchholz, MD

…of Radiation Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX

**El tratamiento sistémico primario ha cambiado el tratamiento locoregional y lo va a seguir cambiando**

Review Article

Page 1 of 13

Indications for adjuvant radiation therapy in breast cancer: a review of the evidence and recommendations for clinical practice

Cameron W. Swanick, Benjamin D. Smith

Department of Radiation Oncology, MD Anderson Cancer Center, Houston, Texas, USA

*Contributions:* (I) Conception and design: All authors; (II) Administrative support: None; (III) Provision of study materials or patients: None; (IV) Collection and assembly of data: All authors; (V) Data analysis and interpretation: All authors; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

*Correspondence to:* Benjamin D. Smith, MD. Department of Radiation Oncology, The University of Texas MD Anderson Cancer Center, 1515 Holcombe Boulevard, Unit 1202, Houston, TX 77030, USA. Email: bsmith3@mdanderson.org.

**Abstract:** Radiation therapy (RT) plays an important role in the curative management of all stages of breast cancer. The optimal application of adjuvant RT is an area of continuous investigation, and the indications for treatment are refined with each new trial. This article reviews the evidence for adjuvant RT across five distinct clinical scenarios, with additional discussion of RT targets, techniques, and doses where appropriate.

**Keywords:** Breast cancer; clinical decision-making; radiation

Submitted Jan 06, 2016. Accepted for publication Jan 26, 2016.
doi: 10.21037/eco.2016.03.15
View this article at: http://dx.doi.org/10.21037/eco.2016.03.15

El tratamiento sistémico primario disminuye el número de mastectomías y debe permitir disminuir la agresividad del tratamiento locoregional

Es particularmente complicado cuando los ganglios eran clínica o citológicamente positivos antes y negativos después del tratamiento sistémico

Si pN1 linfadenenctomía e irradiación si pN0 …

Received: 29 September 2019 | Accepted: 1 October 2019
DOI: 10.1111/tbj.13719

ORIGINAL ARTICLE

The Breast Journal WILEY

## Management of the clinically positive axilla

David M. Euhus MD

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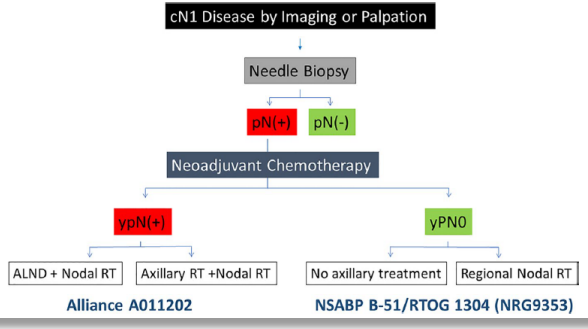
**Abstract**

Axillary dissection has been the standard of care for any patient with clinically positive lymph nodes at initial breast cancer presentation. However, modern neo-adjuvant therapies can convert positive nodes to negative nodes, especially in the setting of HER2-positive disease. Accurate axillary staging can be achieved after neo-adjuvant therapy in initially node-positive patients using dual tracer lymphatic mapping, removal of three or more lymph nodes, and confirmation of excision of the previously biopsied and clipped lymph node. Currently accruing clinical trials are designed to determine which patients can safely avoid axillary dissection and/or axillary radiation.

KEYWORDS
axillary dissection, axillary lymph nodes, breast neoplasms, neo-adjuvant chemotherapy



**FIGURE 1** Two important currently accruing randomized phase III trials seeking to titrate axillary treatment in clinically node-positive patients receiving neo-adjuvant chemotherapy. ALND, axillary lymph node dissection; RT, radiation therapy [Color figure can be viewed at wileyonlinelibrary.com]




La linfadenectomía axilar está todavía indicada en los casos de afectación independientemente de su negativización, pero la BSGC de más de 2 ganglios o la comprobación de la negativización del ganglio es una alternativa

ARTICLE IN PRESS

ESMO GOOD SCIENCE BETTER MEDICINE BEST PRACTICE

ANNALS OF ONCOLOGY driving innovation in oncology

SPECIAL ARTICLE

## Customizing local and systemic therapies for women with early breast cancer: the St. Gallen International Consensus Guidelines for treatment of early breast cancer 2021

H. J. Burstein[1*†], G. Curigliano[2*†], B. Thürlimann[3], W. P. Weber[4], P. Poortmans[5], M. M. Regan[1], H. J. Senn[6], E. P. Winer[1] & M. Gnant[7], Panelists of the St Gallen Consensus Conference[‡]

[1]Dana-Farber Cancer Institute, Harvard Medical School, Boston, USA; [2]European Institute of Oncology, University of Milan, Milan, Italy; [3]Cantonal Hospital, St. Gallen; [4]University of Basel, Basel, Switzerland; [5]University of Antwerp, Antwerp, Belgium; [6]St. Gallen Oncology Conferences (Foundation SONK), St. Gallen, Switzerland; [7]Medical University of Vienna, Vienna, Austria

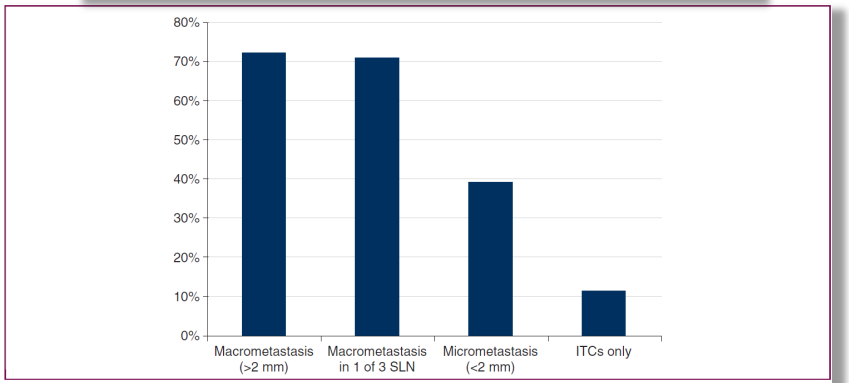



**Figure 4. Is axillary dissection required for residual cancer in lymph nodes after standard neoadjuvant chemotherapy?[a]**
Percentage of panelists favoring axillary dissection.
ITC, isolated tumor cells; SLN, sentinel lymph nodes.
[a] It was assumed that post-surgical radiation therapy would be given regardless.

- La irradiación ganglionar debe ser considerada incluso después de una remisión completa
- La linfadenectomía es de elección en las pacientes con afectación ganglionar después de TSP
- Discutible en micrometástasis y células aisladas, podría sustituirse por irradiación

Ann Surg Oncol (2018) 25:2596–2602
https://doi.org/10.1245/s10434-018-6637-9

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

ORIGINAL ARTICLE – BREAST ONCOLOGY

## Decreasing Use of Axillary Dissection in Node-Positive Breast Cancer Patients Treated with Neoadjuvant Chemotherapy

Toan T. Nguyen, MD[1], Tanya L. Hoskin, MS[2], Courtney N. Day, BS[2], Amy C. Degnim, MD[1], James W. Jakub, MD[1], Tina J. Hieken, MD[1], and Judy C. Boughey, MD[1]

[1]Department of Surgery, Mayo Clinic, Rochester, MN; [2]Department of Health Sciences Research, Mayo Clinic, Rochester, MN

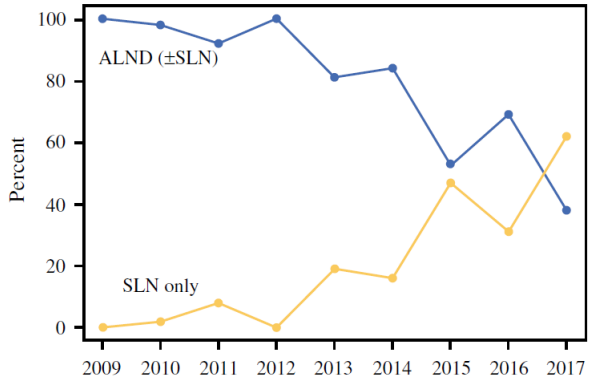



**FIG. 1** Increasing use of SLN surgery only and decreasing use of ALND from 2009 to 2017 for cN1 patients treated with neoadjuvant chemotherapy. *ALND* axillary lymph node dissection, *SLN* sentinel lymph node

Si se negativizan los ganglios se deja de hacer la linfadenectomía

Breast Cancer Research and Treatment (2020) 180:725–733
https://doi.org/10.1007/s10549-020-05589-3

CLINICAL TRIAL

## De-escalation of axillary surgery in breast cancer patients treated in the neoadjuvant setting: a Dutch population-based study

J. M. Simons[1,2,3,10] · L. B. Koppert[1] · E. J. T. Luiten[4] · C. C. van der Pol[5] · S. Samiei[3,6] · J. H. W. de Wilt[7] · S. Siesling[8,9] · M. L. Smidt[3,6]

Received: 6 November 2019 / Accepted: 6 March 2020 / Published online: 16 March 2020



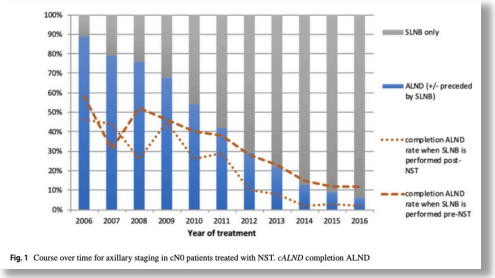



**Fig. 1** Course over time for axillary staging in cN0 patients treated with NST. *cALND* completion ALND

- Tras TSP las linfadenectomías están disminuyendo en todos los grupos, cN0, cN+, ypN0 e ypN+.
- **Difícil saber en qué pacientes cN+ y pN+ se puede omitir**

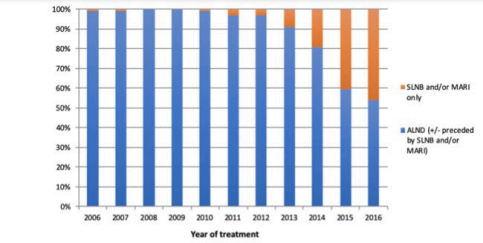


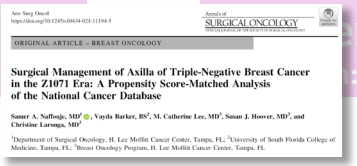

**Fig. 2** Course over time for axillary staging in cN+ patients treated with NST

**Table 2** Overview of decrease in ALND rates for subgroups based on ypN status for both cN0 and cN + patients (all patients of the cohort were included in this analysis)

| Year of diagnosis | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| cN0 patients, *n* | 164 | 138 | 191 | 185 | 303 | 523 | 610 | 831 | 943 | 1280 | 662 |
| ALND rate in: | | | | | | | | | | | |
| ypN0, % (absolute numbers) | 78.3 (65/83) | 69.7 (62/89) | 63.2 (67/106) | 44.2 (42/95) | 31.9 (59/185) | 13.1 (37/282) | 6.1 (22/359) | 3.8 (20/520) | 3 (19/626) | 2.4 (22/927) | 1.2 (6/512) |
| ypN+, % (absolute numbers) | 100 (81/81) | 95.9 (47/49) | 91.8 (78/85) | 92.2 (83/90) | 88.1 (104/118) | 75.9 (183/241) | 61.8 (155/251) | 50.5 (157/311) | 31.2 (99/317) | 24.6 (87/353) | 22.7 (34/150) |
| Year of diagnosis | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| cN + patients, *n* | 302 | 363 | 456 | 487 | 487 | 606 | 608 | 744 | 806 | 1120 | 652 |
| ALND rate in: | | | | | | | | | | | |
| ypN0, % (absolute numbers) | 98.2 (55/56) | 98.8 (85/86) | 100 (103/103) | 100 (82/82) | 93.6 (102/109 | 92.1 (116/126 | 94 (125/133) | 80 (133/166) | 65.9 (116/176) | 45.2 (109/241) | 41.9 (49/117) |
| ypN+, % (absolute numbers) | 99.6 (245/246) | 99.6 (276/277) | 100 (353/353) | 99.8 (404/405) | 100 (378/378) | 97.9 (470/480) | 97.3 (462/475) | 93.6 (541/578) | 84.9 (535/630) | 61.7 (542/879) | 55.5 (297/535) |

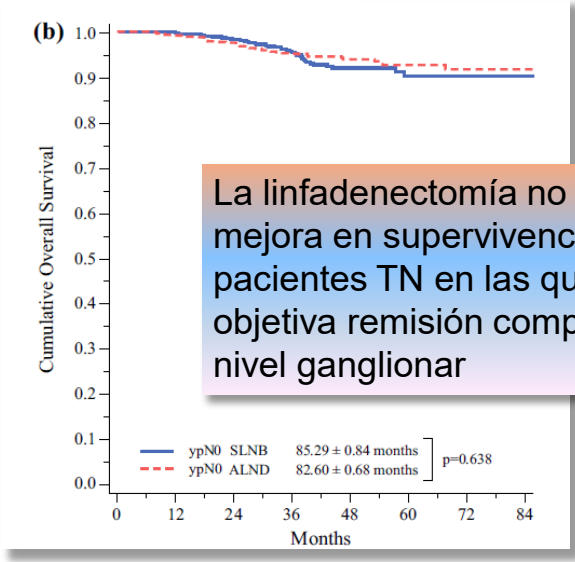
# pia cáncer de mama 2025

## lionares – Tras quimioterapia neoadyuvante

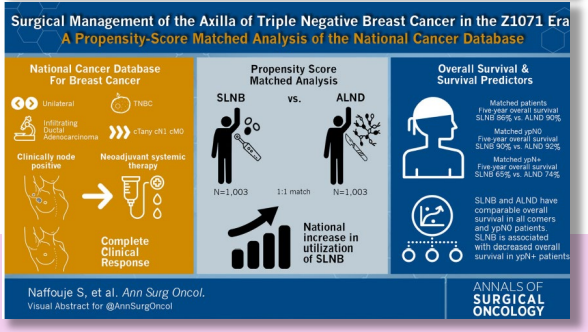


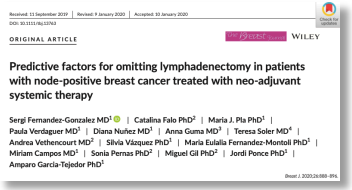
Surgical Management of Axilla of Triple-Negative Breast Cancer in the Z1071 Era: A Propensity Score-Matched Analysis of the National Cancer Database

ASO Visual Abstract: Surgical Management of the Axilla of Triple-Negative Breast Cancer in the Z1071 Era—A Propensity-Score Matched Analysis of the National Cancer Database



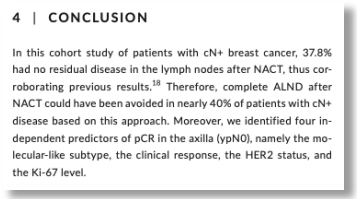

La linfadenectomía no ofrece mejora en supervivencia en pacientes TN en las que se objetiva remisión completa a nivel ganglionar



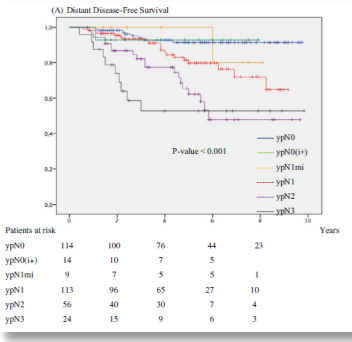
Predictive factors for omitting lymphadenectomy in patients with node-positive breast cancer treated with neo-adjuvant systemic therapy

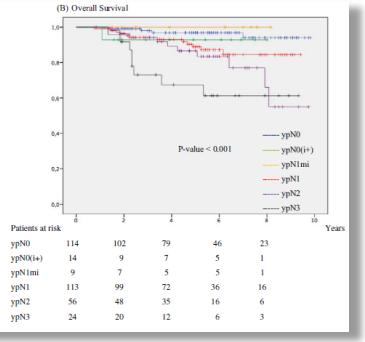
Sergi Fernandez-Gonzalez MD[1] | Catalina Falo PhD[2] | María J. Pla PhD[1] | Paula Verdaguer MD[1] | Diana Nuñez MD[1] | Anna Guma MD[1] | Teresa Soler MD[4] | Andrea Vethencourt MD[2] | Silvia Vázquez PhD[1] | María Eulalia Fernandez-Montoli PhD[2] | Miriam Campos MD[1] | Sonia Pernas PhD[2] | Miguel Gil PhD[2] | Jordi Ponce PhD[1] | Amparo García-Tejedor PhD[1]

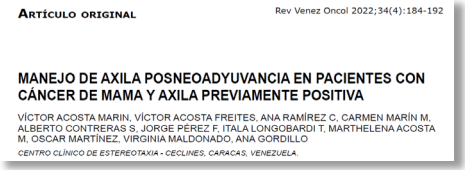


4 | CONCLUSION

In this cohort study of patients with cN+ breast cancer, 37.8% had no residual disease in the lymph nodes after NACT, thus corroborating previous results.[18] Therefore, complete ALND after NACT could have been avoided in nearly 40% of patients with cN+ disease based on this approach. Moreover, we identified four independent predictors of pCR in the axilla (ypN0), namely the molecular-like subtype, the clinical response, the HER2 status, and the Ki-67 level.



ARTÍCULO ORIGINAL

Rev Venez Oncol 2022;34(4):184-192

MANEJO DE AXILA POSNEOADYUVANCIA EN PACIENTES CON CÁNCER DE MAMA Y AXILA PREVIAMENTE POSITIVA

VÍCTOR ACOSTA MARIN, VÍCTOR ACOSTA FREITES, ANA RAMÍREZ C, CARMEN MARÍN M, ALBERTO CONTRERAS S, JORGE PÉREZ F, ITALA LONGOBARDI T, MARTHELENA ACOSTA M, OSCAR MARTÍNEZ, VIRGINIA MALDONADO, ANA GORDILLO

CENTRO CLÍNICO DE ESTEREOTAXIA - CECLINES, CARACAS, VENEZUELA.

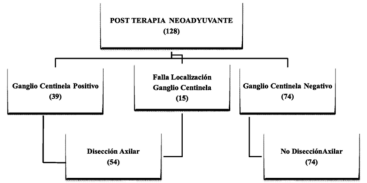



**Figura 1**. Posterior a la aplicación de TNA.

Concluimos en que la BGC es eficaz y segura en pacientes con cáncer de mama y axila positiva que habiendo recibido TNA presentan una respuesta clínica e imagenológica completa en axila, haciendo posible omitir la DA a un grupo de pacientes, sin comprometer su supervivencia.

- **La linfadenectomía puede evitarse en ypN0** (incluyendo ypNi+)
- El subtipo molecular, la respuesta clínica, el estatus del receptor HER y un KI 67 elevado son factores predictivos de respuesta

Ann Surg Oncol
https://doi.org/10.1245/s10434-020-08900-0

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

ORIGINAL ARTICLE – BREAST ONCOLOGY

## Oncologic Outcomes of Sentinel Lymph Node Surgery After Neoadjuvant Chemotherapy for Node-Positive Breast Cancer

**Mara A. Piltin, DO[1], Tanya L. Hoskin, MS[2], Courtney N. Day, BS[2], John Davis Jr., MD[1], and Judy C. Boughey, MD[1]**

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Published online: 10 August 2020

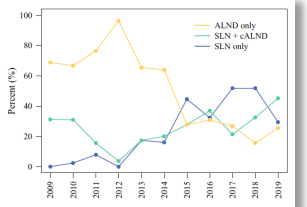


FIG. 1 Type of axillary procedure performed after neoadjuvant chemotherapy for patients with node-positive breast cancer at presentation over time from years 2009 through 2019

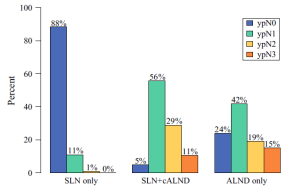


FIG. 2 Pathologic nodal category by axillary surgery performed for patients from 2015 to 2019

## CONCLUSIONS

This study documented the adoption of clinical trial results and the practice change of incorporating SLN surgery after NAC for patients who present with cN1-3 disease at our institution. Axillary recurrence data support the conclusion that SLN surgery alone for selected patients who have an excellent response to NAC is not oncologically inferior to ALND during a short-term follow-up period.

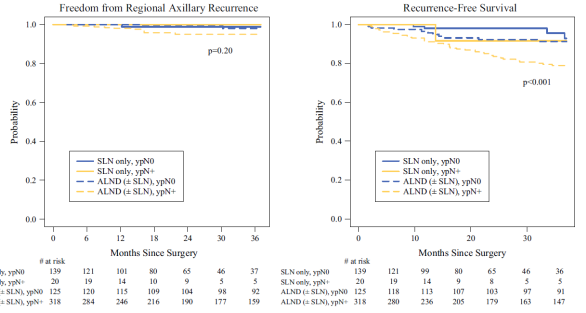


FIG. 3 Kaplan–Meier estimates of freedom from regional axillary recurrence and recurrence-free survival by axillary surgery performed and pathologic nodal response to neoadjuvant chemotherapy

Ann Surg Oncol
https://doi.org/10.1245/s10434-020-08954-0

Annals of SURGICAL ONCOLOGY
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ASO AUTHOR REFLECTIONS

## ASO Author Reflections: Sentinel Lymph Node Surgery After Neoadjuvant Chemotherapy for Node-Positive Breast Cancer: Is It Oncologically Safe?

**Mara A. Piltin, DO, and Judy C. Boughey, MD**

Department of Surgery, Mayo Clinic, Rochester, MN

Published online: 31 July 2020

### PAST

Chemotherapy prior to surgery for the management of breast cancer is advancing, becoming more individualized by tumor subtype and being utilized with improved efficacy, calling for an evolution in surgical care. In patients with clinically node-positive disease at time of diagnosis, large prospective trials have shown that sentinel lymph node surgery after neoadjuvant chemotherapy is feasible with acc
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### PRESENT

The utilization of sentinel lymph node surgery after neoadjuvant chemotherapy for patients who present with node-positive disease is becoming more widely incorporated into clinical practice. In our institutional series, we found a 43.9% rate of nodal pathologic complete response (node po
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### FUTURE

Future investigation of this patient population is critical to have larger cohorts with longer follow-up to further establish the oncologic safety of sentinel node surgery in this setting. Additionally, larger cohorts would allow evaluation of this question by tumor biologic subtype and also potentially refine appropriate patient selection for proceeding with sentinel node surgery versus directly to axillary dissection. Importantly, our results support that we are not putting our patients at risk by deescalating axillary surgery after neoadjuvant chemotherapy. Longer follow-up data are needed to report on breast cancer-specific survival as well as 5- and 10-year locoregional recurrence rates.

The ongoing Alliance A11202 trial is further evaluating the outcomes of patients with a positive sentinel node in this setting, randomizing patients to axillary lymph node dissection versus axillary radiation with no additional axillary surgery. This study is currently enrolling patients and will require follow-up for breast cancer events. With advances in tumor genomics, breast imaging, and systemic therapies, including immunotherapy and chemotherapy, the role and extent of axillary surgery for staging should be continually reevaluated to provide a more individualized approach based on tumor biology, tumor response to therapy, and patient and tumor factors, allowing safe deescalation where appropriate.

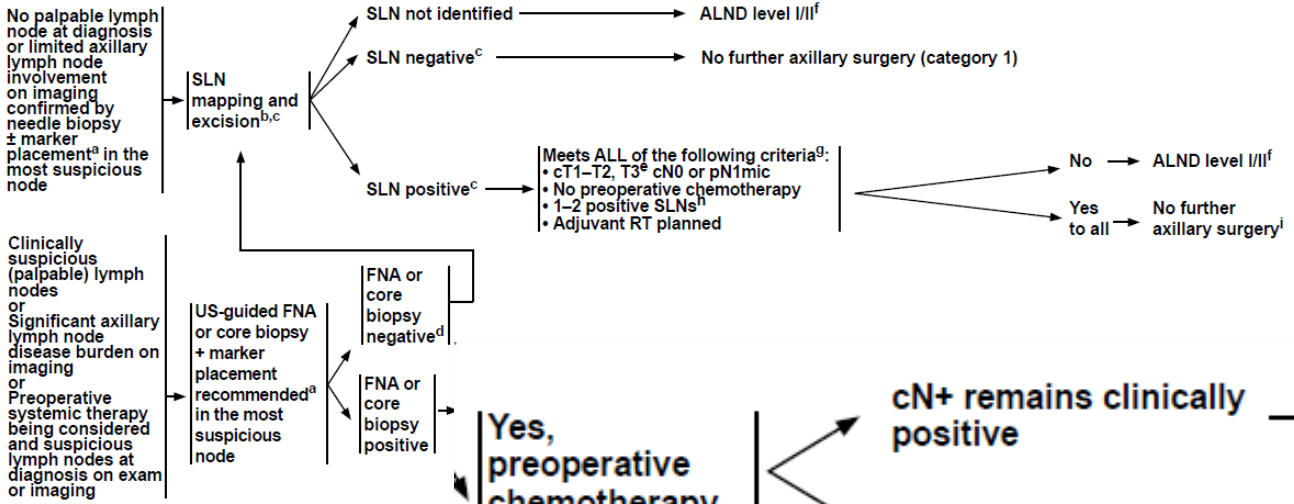
- Cada vez se utiliza más la BSGC tras tratamiento sistémico primario en pacientes N+
- **El 80% de las pacientes recibieron irradiación**
- Hay que hacer más estudios

National Comprehensive Cancer Network®

# NCCN Guidelines Version 1.2025
# Invasive Breast Cancer

NCCN Guidelines Index
Table of Contents
Discussion

## CONSIDERATIONS FOR SURGICAL AXILLARY STAGING




[a] If a positive lymph node is clipped or tattooed during biops
should be made to remove the clipped or tattooed node a
surgery. Only the most suspicious node should be marke
along with SLNs to reduce the false negative rate.
[b] SLN mapping injections may be peritumoral, subareolar, o
[c] Sentinel node involvement is defined by multilevel node sectioning with hematoxylin and eosin (H&E) staining. Cytokeratin IHC may be used for equivocal cases on H&E. Routine cytokeratin IHC to define node involvement is not recommended in clinical decision-making.
[d] If clinically negative axilla before chemotherapy and then have a positive sentinel node after chemotherapy, consider completion axillary lymph node dissection or multidisciplinary tumor board discussion on appropriateness of radiation of axilla without further surgery.
[e] Limited data exist for T3 tumors.
[f] Axillary Lymph Node Staging (BINV-E).

One. Tinterri C, et al. Br J Surg 2023;110:1145-1152. Galimberti V, et al. Lancet Oncol 2013;14:297-305.
[h] Limited data exist for ≥3 positive SLNs.
[i] In the mastectomy setting, in patients who were initially cN0, who have positive nodes on SLNB, and have no axillary dissection, RT to the chest wall should include undissected axilla at risk ± RNI.
[j] Among patients shown to be N+ prior to preoperative systemic therapy, SLNB has a >10% false-negative rate when performed after preoperative systemic therapy, which can be improved by marking and removing the most suspicious biopsied node, using dual tracers, and by obtaining ≥3 sentinel nodes (targeted axillary lymph node dissection). (Caudle AS, et al. J Clin Oncol 2016;34:1072-1078.)

**Note: All recommendations are category 2A unless otherwise indicated.**

# ¿Qué cirugía se está haciendo?

- Si remisión completa — **BSGC**
- Si no remisión completa — **Linfadenectomía o BSGC**

# ¿Qué estamos irradiando?

National Comprehensive Cancer Network®

# NCCN Guidelines Version 1.2025
## Invasive Breast Cancer

NCCN Guidelines Index
Table of Contents
Discussion

OPERABLE I
SURGICAL T

BCS possibl

BCS not pos

**BCS possible**

**BCS not possible**

**BCS with surgical axillary staging (BINV-D) ± oncoplastic reconstruction[n]**

**Mastectomy and surgical axillary staging (BINV-D) ± reconstruction[w]**

**cN+ and ypN0: Adjuvant whole breast RT ± boost to the tumor bed[yy]; and strongly consider comprehensive RNI with inclusion of any portion of the undissected axilla at risk.[zz]**

**Any ypN+: Adjuvant whole breast RT ± boost to the tumor bed[yy]; and comprehensive RNI with inclusion of any portion of the undissected axilla at risk.**

- **Any cN0, ypN0: Adjuvant whole breast RT ± boost to tumor bed[yy]**

**Adjuvant systemic therapy[xx] (BINV-16) + PMRT[s]**
- **cN+ and ypN0: Strongly consider PMRT to the chest wall and comprehensive RNI with inclusion of any portion of the undissected axilla at risk.[zz]**
- **Any ypN+: PMRT is indicated to the chest wall + comprehensive RNI with inclusion of any portion of the undissected axilla at risk.**
- **cT4, any N: RT is indicated to the chest wall + comprehensive RNI with inclusion of any portion of the undissected axilla at risk.**
- **cT3, cN0, and ypN0: Consider PMRT to the chest wall + comprehensive RNI with inclusion of any portion of the undissected axilla at risk.**

**Adjuvant systemic therapy[xx] (BINV-16), no PMRT**
- **Any cN0,ypN0: If axilla was assessed by SLNB or axillary node dissection**

[n] Includes techniques such as local tissue rearrangement, local flaps, regional flaps, breast reduction, and mastopexy to allow for gre… optimizing aesthetic outcomes in patients undergoing BCS.
[s] Principles of Radiation Therapy (BINV-I).
[t] Special Considerations for Breast Cancer in Males (Sex Assigned at Birth) (BINV-J).
[w] Principles of Breast Reconstruction Following Surgery (BINV-H).
[ww] The accurate assessment of in-breast tumor or regional lymph node response to preoperative systemic therapy is difficult, and sh… and performance of imaging studies (mammogram and/or breast ultrasound and/or breast MRI) that were abnormal at the time of … imaging methods prior to surgery should be determined by the multidisciplinary team. MRI is more accurate than mammography … preoperative therapy.
[xx] Complete planned systemic therapy regimen course if not completed preoperatively.
[yy] Strongly consider RT boost for high-risk features (eg, high-grade disease, age <50 years).
[zz] Based on emerging data, there may be subsets of patients who achieve pCR in nodes that may not benefit from RNI (in BCS setti… setting). (Mamounas E, Bandos H, White J, et al. Loco-regional irradiation in patients with biopsy-proven axillary node Involvement … pathologically node-negative after neoadjuvant chemotherapy: Primary outcomes of NRG Oncology/NSABP B-51/RTOG 1304; Abs…

**Note: All recommendations are category 2A unless otherwise indicated.**





**ypN0**: Considerar seriamente la irradiación ganglionar con inclusión de los ganglios no extirpados

**ypN+**: irradiación ganglionar con inclusión de los ganglios no extirpados

Ann Surg Oncol (2019) 26:2475–2485
https://doi.org/10.1245/s10434-019-07453-1

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

ORIGINAL ARTICLE – BREAST ONCOLOGY

## Role of Postmastectomy Radiotherapy After Neoadjuvant Chemotherapy in Breast Cancer Patients: A Study from the Japanese Breast Cancer Registry

Minoru Miyashita, MD, PHD[1], Naoki Niikura, MD, PHD[2], Hiraku Kumamaru, MD, PHD[3], Hiroaki Miyata, MD, PHD[4], Takayuki Iwamoto, MD, PHD[5], Masaaki Kawai, MD, PHD[6], Keisei Anan, MD, PHD[7], Naoki Hayashi, MD, PHD[8], Kenjiro Aogi, MD, PHD[9], Takanori Ishida, MD, PHD[1], Hideji Masuoka, MD, PHD[10], Kotaro Iijima, MD, PHD[11], Shinobu Masuda, MD, PHD[12], Koichiro Tsugawa, MD, PHD[13], Takayuki Kinoshita, MD, PHD[14], Hitoshi Tsuda, MD, PHD[15], Seigo Nakamura, MD, PHD[16], and Yutaka Tokuda, MD, PHD[2]


FIG. 2 Locoregional recurrence (LRR)-free survival, distant disease-free survival, and overall survival of breast cancer patients with or without PMRT in the ypN0, ypN1, and ypN2–3 cohort. *PMRT* postmastectomy radiotherapy, *ypN* pathologically lymph node status

J Breast Cancer. 2019 Jun;22(2):285-296
https://doi.org/10.4048/jbc.2019.22.e25
pISSN 1738-6756-eISSN 2092-9900

Journal of Breast Cancer JBC

Original Article

Check for updates

## The Benefit of Post-Mastectomy Radiotherapy in ypN0 Patients after Neoadjuvant Chemotherapy According to Molecular Subtypes

Won Kyu... [illegible] In Ho Kim[2], Young Lee[2],


Figure 2. Kaplan-Meier curves of LRR according to PMRT in subgroups by molecular subtype and residual breast disease. LRR according to PMRT in the (A) luminal subtype (n = 86), (B) HER2 subtype (n = 49), and (C) triple-negative subtype (n = 54).
LRR = loco-regional recurrence; PMRT = post-mastectomy radiation therapy; HER2=human epidermal growth factor receptor 2.

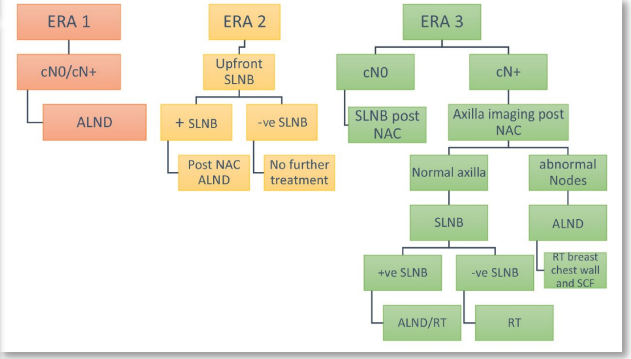
ARTICLE IN PRESS

THE SURGEON XXX (XXXX) XXX

## Management of the axilla following neoadjuvant chemotherapy for breast cancer- A change in practice

Bahaty Riogi [a,*,1], Raj Sripadam [b], David Barker [c], Olga Harris [d], Helen Innes [b], Leena Chagla [a]

[a] Department of Breast Surgery, St Helens and Knowsley Teaching Hospitals NHS Trust, Liverpool, UK
[b] Department of Clinical and Medical Oncology, Clatterbridge Centre for Oncology, Liverpool, UK
[c] Department of Pathology, St Helens and Knowsley Teaching Hospitals NHS Trust, Liverpool, UK
[d] Department of Radiology, St Helens and Knowsley Teaching Hospitals NHS Trust, Liverpool, UK




**Dos tratamientos locales axilares no mejoran los resultados**

- Se está desescalando el tratamiento local de la axila.
- **Si los ganglios eran positivos deben tratarse**

Tras remisión completa ganglionar si se realiza una linfadenectomía axilar la irradiación **no mejora** los resultados

Strahlenther Onkol
https://doi.org/10.1007/s00066-018-1270-x

ORIGINAL ARTICLE

# Individualization of post-mastectomy radiotherapy and regional nodal irradiation based on treatment response after neoadjuvant chemotherapy for breast cancer

## A systematic review

David Krug[1,2] · René Baumann[3] · Wilfried Budach[4] · Jürgen Dunst[3] · Petra Feyer[5] · Rainer Fietkau[6] · Wulf Haase[7] · Wolfgang Harms[8] · Thomas Hehr[9] · Marc D. Piroth[10] · Felix Sedlmayer[11] · Rainer Souchon[12] · Frederik Wenz[13] · Rolf Sauer[6]

Received: 13 January 2018 / Accepted: 16 January 2018

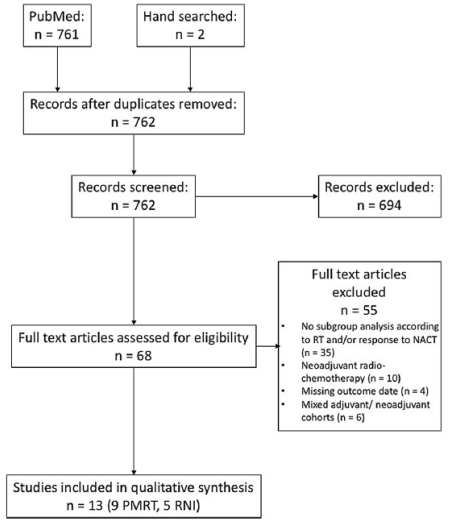




**Fig. 1** Flow diagram of study selection for the systematic review according to the preferred reporting items for systematic reviews and meta-analyses (PRISMA) statement [46]. *RT* radiotherapy, *NACT* neoadjuvant chemotherapy, *PMRT* post-mastectomy radiotherapy, *RNI* regional nodal irradiation

sence of more profound evidence to date, PMRT should be strongly considered in patients with stage II disease and clinically involved lymph nodes and pCR/ypN0, especially in the context of further risk factors (e.g., young age, ER/PR-negative, lymphovascular invasion, residual tumor in the breast).

La irradiación postmastectomía debe ser considerada

surgery [10, 11], RNI should be strongly considered in patients with clinically involved lymph nodes regardless of the response to NACT, especially in the context of further risk factors (e.g., young age, ER/PR-negative, lymphovascular invasion, residual tumor in the breast). Furthermore, RNI should be performed in patients with lymph node involvement after NACT, due to the significant risk of regional recurrence [5].

La irradiación ganglionar debe ser considerada en pacientes con afectación axilar independientemente de la respuesta y debe ser realizada si persiste la afectación

Ann Surg Oncol
DOI 10.1245/s10434-014-3968-z

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

EDITORIAL – BREAST ONCOLOGY

# Targeting Regional Nodal Basins in Breast Cancer Patients: Exactly What Are We Treating?

Sharad Goyal, MD and Bruce G. Haffty, MD

Department of Radiation Oncology, Rutgers Cancer Institute of New Jersey, Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ

El oncólogo radioterápico debe ser consciente de la cirugía realizada y del resultado histológico para realizar un diseño óptimo del volumen ganglionar a irradiar

of RT in this patient population. In the era of Z0011, radiation oncologists should be cognizant of when to apply RNI and coverage of the axilla in this patient population. With careful attention to surgical technique and pathologic details in addition to the proper utilization of RT field design, we can help ensure that local relapse and toxicity rates in the conservatively managed breast cancer patient continues to be low. In addition, one may refer to nomograms which predict the risk of having additional non-SLN in patients with a positive SLNB when determining the optimal field design for patients who did not receive an ALND. Finally, efforts should be made to determine the optimal management of the regional nodes in patients with positive SLNB in a multidisciplinary setting.

Cancer Treatment Reviews 101 (2021) 102297

Contents lists available at ScienceDirect

Cancer Treatment Reviews

journal homepage: www.elsevier.com/locate/ctrv

# De-escalation of axillary irradiation for early breast cancer – Has the time come?

Elżbieta Senkus [a,*], Maria Joao Cardoso [b,c], Orit Kaidar-Person [d,e,f], Aleksandra Łacko [g,h], Icro Meattini [i,j], Philip Poortmans [k,l]

- La BSGC sustituye a la LA en pacientes que se negativizan tras TSP
- **Las pacientes con cN+ que tras TSP pasan a ypN0, probablemente no necesitan irradiación de todos los ganglios**
- La irradiación sustituirá a la LA en pacientes con G+

Policy Review

# Breast conservation and axillary management after primary systemic therapy in patients with early-stage breast cancer: the Lucerne toolbox

Peter Dubsky*, Katja Pinker*, Fatima Cardoso, Giacomo Montagna, Mathilde Ritter, Carsten Denkert, Isabel T Rubio, Evandro de Azambuja, Giuseppe Curigliano, Oreste Gentilini, Michael Gnant, Andreas Günthert, Nik Hauser, Joerg Heil, Michael Knauer, Mona Knotek-Roggenbauerc, Susan Knox, Tibor Kovacs, Henry M Kuerer, Sibylle Loibl, Meinrad Mannhart, Icro Meattini, Frederique Penault-Llorca, Nina Radosevic-Robin, Patrizia Sager, Tanja Španić, Petra Steyerova, Christoph Tausch, Marie-Jeanne T F D Vrancken Peeters, Walter P Weber, Maria J Cardoso†, Philip Poortmans†

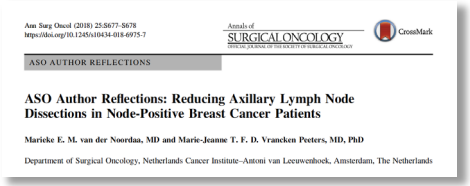
Lancet Oncol 2021; 22: e18–28

Primary systemic therapy is increasingly used in the treatment of patients with early-stage breast cancer, but few

Lancet Oncol 2021; 22: e18–28

La extensión de la irradiación ganglionar tras una remisión completa debe tener en cuenta otros factores

It is important to emphasise that the panel's statements regarding regional nodal irradiation were within the context of patients with nodal pathological complete response after the initial cN1 stage. In this context, both the indication and extent of regional nodal irradiation should depend on interdisciplinary discussion with consideration to other risk factors, similar to the consensus statement issued by the St Gallen panel.[11] The St Gallen panel suggested that radiotherapy can be tailored according to the response to PST. The extent of pathologically defined remission after PST can be used to modify radiotherapy indications in combination with clinical tumour stage at diagnosis. Particularly, pathological complete response after PST can indicate that radiotherapy is not needed. One example to show this is in patients with cT3 (who have tumours larger than 5 cm at diagnosis) without other risk factors (such as multifocality), who have a pathological complete response after PST and have undergone mastectomy. The indication to carry out postmastectomy radiotherapy in these patients can be questioned.



Ann Surg Oncol (2018) 25:S677–S678
https://doi.org/10.1245/s10434-018-6975-7

Annals of SURGICAL ONCOLOGY

ASO AUTHOR REFLECTIONS

**ASO Author Reflections: Reducing Axillary Lymph Node Dissections in Node-Positive Breast Cancer Patients**

Marieke E. M. van der Noordaa, MD and Marie-Jeanne T. F. D. Vrancken Peeters, MD, PhD

Department of Surgical Oncology, Netherlands Cancer Institute–Antoni van Leeuwenhoek, Amsterdam, The Netherlands

**Pasado:**

Estamos sobretratando la axila

**Presente**

Hay estudios que intentan demostrar en que casos se puede *omitir* el tratamiento axilar

**Futuro**

Las pruebas de imagen ayudarán a decidir y se necesitan estudios para desescalar

**PAST**

Improvements in neoadjuvant systemic therapy (NST) for breast cancer patients have led to increasing rates of pathologic complete response (pCR), allowing for less-extensive surgery of the breast and axillary lymph nodes (ALNs). Despite current pCR rates as high as 80% in patients with HER2+/hormone receptor-negative tumors,[1] ALN dissections (ALNDs) are clinically node positive (cN+) essary comorbidity. One of th with the potential to de-escalate continuing lack of consensus c ing method in cN+ patients pc sentinel lymph node biopsy ( formed in cN0 patients, SLN false-negative rates (FNRs) in trials analyzing axillary staging cN1 patients, while pCR rates high. Omitting ALND in th reduce comorbidity since regardless of response in these

**PRESENT**

This study reports on the implementation of a new axillary staging protocol for cN+ patients at the Netherlands Cancer Institute, leading to a substantial decrease in ALNDs (82%).[3] In this protocol, axillary treatment is based on the number of positive nodes on positron emission tomography/computed tomography (PET/CT) pre-NST, and the MARI procedure (Marking Axillary lymph nodes with Radioactive Iodine seeds). of the tumor-positive ALNs is node) and is selectively remove patients with less than four susp tumor-negative MARI node, n ment was performed (25%). A was performed in patients with l on PET/CT and a tumor-positiv patients with four or more node negative MARI node. Only in suspect nodes on PET/CT and ALND performed (18%). Durin months, one patient in whom oped an axillary, parasternal an

**FUTURE**

These results emphasize the critical appraisal of performing ALND in cN+ patients with excellent response to NST. ALND itself has never been demonstrated to have a positive impact on survival. The estimated recurrence risk should be weighed against the significant comorbidity associated with ALND and/or ART, and axillary management should be adapted accordingly.

The MARI procedure provides an adequate staging method in cN1–3 patients post-NST. Alternatively, the MARI procedure can be combined with SLNB with a similar low FNR.[6] The final axillary treatment (ART, ALND, or no treatment) can be determined with the use of PET/CT by assessing the extent of axillary disease pre-NST. The safety of our protocol needs to be confirmed by long-term follow-up and other trials. Moreover, until now, prospective trials have included cN0–1 patients only,[7] whereas cN2–3 patients should also be included. The need for trials that focus on axillary treatment de-escalation is emphasized by current extensive research towards omitting surgery of the breast in patients with pCR, such as our MICRA trial.[8]

Ann Surg Oncol (2021) 28:1328–1335
https://doi.org/10.1245/s10434-020-09136-8

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

ORIGINAL ARTICLE – BREAST ONCOLOGY

## Does Failure to Achieve Pathologic Complete Response with Neoadjuvant Chemotherapy Identify Node-Negative Patients Who Would Benefit from Postmastectomy Radiation or Regional Nodal Irradiation?

**Angelena Crown, MD[1], Mithat Gonen, PhD[2], Tiana Le, BA[1], and Monica Morrow, MD[1]**

[1]Breast Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, NY; [2]Biostatistics Service, Department of Epidemiology and Biostatistics, Memorial Sloan Kettering Cancer Center, New York, NY

Ann Surg Oncol (2021) 28:1336–1337
https://doi.org/10.1245/s10434-020-09138-6

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

ASO AUTHOR REFLECTIONS

## ASO Author Reflections: Residual Disease in the Breast After Neoadjuvant Chemotherapy Does Not Mandate Routine Post-Mastectomy Radiation Therapy/Regional Nodal Irradiation

**Angelena Crown, MD, and Monica Morrow, MD**

Breast Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, NY

### CONCLUSION

The LRR rates for this unselected contemporary cohort of node-negative patients who did not have breast pCR were low for the patients with HR+/HER2− and HER2+ tumors despite omission of PMRT/RNI. In contrast, the TN patients had a 3-year LRR actuarial rate of 10.1%, suggesting a possible role for PMRT/RNI. Although limited follow-up evaluation precludes the ability to draw definitive conclusions regarding 10-year LRR risks, the current data do not support the routine use of PMRT/RNI for node-negative HR+/HER2− and HER2+ patients who have residual disease within the breast.

**Las pacientes N0 TN que no tienen una remisión completa a nivel mamario tienen un elevado riesgo de recidiva que podría disminuirse con la irradiación**

review articl

SPECIAL SERIES: LOCOREGIONAL MANAGEMENT OF BREAST CANCER

## Molecular Predictive and Prognostic Markers in Locoregional Management

Eleftherios P. Mamounas, MD, MPH[1]; Melissa P. Mitchell, MD, PhD[2]; and Wendy A. Woodward, MD, PhD[2]

ASCO
2310 Volume 38, Issue 20

original reports

J Clin Oncol 37. © 2019 by American Society of Clinical Oncology

## Clinicogenomic Radiotherapy Classifier Predicting the Need for Intensified Locoregional Treatment After Breast-Conserving Surgery for Early-Stage Breast Cancer

Martin Sjöström, MD, PhD[1,2]; S. Laura Chang, PhD[3]; Nick Fishbane, MSc[4]; Elai Davicioni, PhD[4]; Shuang G. Zhao, MD[5]; Linda Hartman, PhD[1]; Erik Holmberg, PhD[6]; Felix Y. Feng, MD[7]; Corey W. Speers, MD, PhD[5]; Lori J. Pierce, MD[5]; Per Malmström, MD, PhD[1,2]; Mårten Fernö, PhD[1]; and Per Karlsson, MD, PhD[6]

ELSEVIER
Journal of Medical Imaging and Radiation Sciences 50 (2019) S32-S41
Journal of Medical Imaging and Radiation Sciences
Journal de l'imagerie médicale et des sciences de la radiation
www.elsevier.com/locate/jmir

Invited Commentary

## Personalized Breast Cancer Treatments Using Artificial Intelligence in Radiomics and Pathomics

William T. Tran, MRT(T), MSc, PhD[abcd,*], Katarzyna Jerzak, MSc, MD, FRCPC[adef], Fang-I Lu, MD, FRCPC[ag], Jonathan Klein, MSc, MD, FRCPC, DABR[h], Sami Tabbarah, MSc[ad], Andrew Lagree, MSc[ad], Tina Wu, BSc (cand)[ad], Ivan Rosado-Mendez, MSc, PhD[i], Ethan Law, BSc (cand)[ad], Khadijeh Saednia, MSc[dj], and Ali Sadeghi-Naini, MSc, PhD[adj]

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[b] Faculty of Medicine, Department Radiation Oncology, University of Toronto, Toronto, Canada
[c] Faculty of Health and Wellbeing, Sheffield Hallam University, Sheffield, United Kingdom
[d] Radiogenomics Laboratory, Sunnybrook Health Sciences Centre, Toronto, Canada
[e] Division of Medical Oncology, Sunnybrook Health Sciences Centre, Toronto, Canada
[f] Faculty of Medicine, Department of Medicine, University of Toronto, Toronto, Canada
[g] Anatomic Pathology, Sunnybrook Health Sciences Centre, Toronto, Canada
[h] Department of Radiation Oncology, Albert Einstein College of Medicine, Bronx, USA
[i] Instituto de Física, Universidad Nacional Autónoma de México, Mexico City, Mexico
[j] Department of Electrical Engineering and Computer Science, Lassonde School of Engineering, York University, Toronto, Canada

**Las nuevas herramientas quizás nos puedan ayudar en el futuro**

Breast Cancer Radiotherapy Intensification Classifier

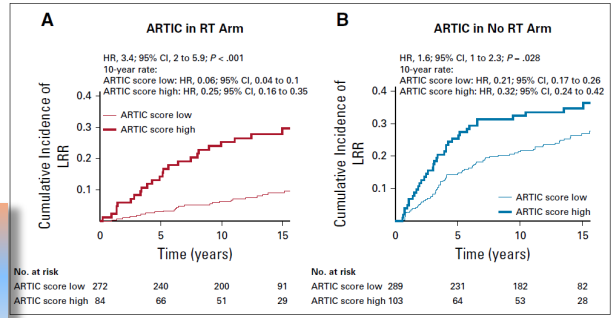


FIG 2. Prognostic performance of Adjuvant Radiotherapy Intensification Classifier (ARTIC) in the SweBCG91-RT validation cohort. Cumulative incidence of locoregional recurrence (LRR) for patients split by the 75th percentile score in (A) the radiotherapy (RT)-treated arm and (B) the no RT arm. HR, hazard ratio.

Breast Cancer Research and Treatment
https://doi.org/10.1007/s10549-022-06580-w

REVIEW

## Value of the 21-gene expression assay in predicting locoregional recurrence rates in estrogen receptor-positive breast cancer: a systematic review and network meta-analysis

Matthew G. Davey[1] · Eoin F. Cleere[1] · John P. O'Donnell[1] · Sara Gaisor[1] · Aoife J. Lowery[1] · Michael J. Kerin[1]

Received: 13 December 2021 / Accepted: 24 March 2022

# De-escalation of radiotherapy after primary chemotherapy in cT1–2N1 breast cancer (RAPCHEM; BOOG 2010–03): 5-year follow-up results of a Dutch, prospective, registry study

Sabine R de Wild, Linda de Munck, Janine M Simons, Janneke Verloop, Thijs van Dalen, Paula H M Elkhuizen, Ruud M A Houben, A Elise van Leeuwen, Sabine C Linn, Ruud M Pijnappel, Philip M P Poortmans, Luc J A Strobbe, Jelle Wesseling, Adri C Voogd, Liesbeth J Boersma

**Summary**

**Background** Primary chemotherapy in breast cancer poses a dilemma with regard to adjuvant locoregional radiotherapy, as guidelines for locoregional radiotherapy were originally based on pathology results of primary surgery. We aimed to

Lancet Oncol 2022; 23: 1201–10

| | Radiotherapy after breast conserving therapy | Radiotherapy after mastectomy |
|---|---|---|
| **Low-risk group** | | |
| ypN0 (ALND) | Whole breast radiotherapy | .. |
| If SLNB before primary chemotherapy and no ALND: cN1mi (SLNB), no risk factor*; or if SLNB after primary chemotherapy and no ALND: ypN0 (SLNB) | Whole breast radiotherapy | .. |
| **Intermediate-risk group** | | |
| ypN1 (ALND) | Whole breast radiotherapy | Chest wall radiotherapy |
| If SLNB before primary chemotherapy and no ALND†: cN1mi (SLNB), ≥1 risk factor*, or cN1 (SLNB), ≤2 macrometastases, no risk factor*; or if SLNB after primary chemotherapy and no ALND†: ypN1mi (SLNB), no risk factor* | Whole breast radiotherapy; in addition axilla level I and II† | Chest wall radiotherapy; in addition axilla level I and II† |
| **High-risk group** | | |
| ypN2–3 (ALND) | Whole breast radiotherapy; axilla level III and IV | Chest wall radiotherapy; axilla level III and IV |
| If SLNB before primary chemotherapy and no ALND†: cN1 (SLNB), with ≤2 macrometastases and ≥1 risk factor*, or ≥3 macrometastases; or if SLNB after primary chemotherapy and no ALND†: ypN1mi (SLNB), ≥1 risk factor*, or ypN1 (SLNB) | Whole breast radiotherapy; axilla level III and IV; in addition axilla level I and II† | Chest wall radiotherapy; axilla level III and IV; in addition axilla level I and II† |

ALND=axillary lymph node dissection. SLNB=sentinel lymph node biopsy. *Risk factor: grade 3, lymphovascular invasion, tumour size more than 3 cm. †If ALND was omitted in the intermediate-risk or high-risk group, radiotherapy of the axilla (level I and II) was recommended. Radiotherapy of the axilla (level I and II) after ALND, and radiotherapy of the internal mammary chain were optional.

*Table 1:* **Study guideline with risk groups based on locoregional recurrence risk, and locoregional radiotherapy recommendations**

**Se decide el volumen de irradiación en función del grupo de riesgo**

**Se valora por recidiva locoregional**

- **GIII**
- **Invasión linfovascular**
- **Tumor > 3 cm**

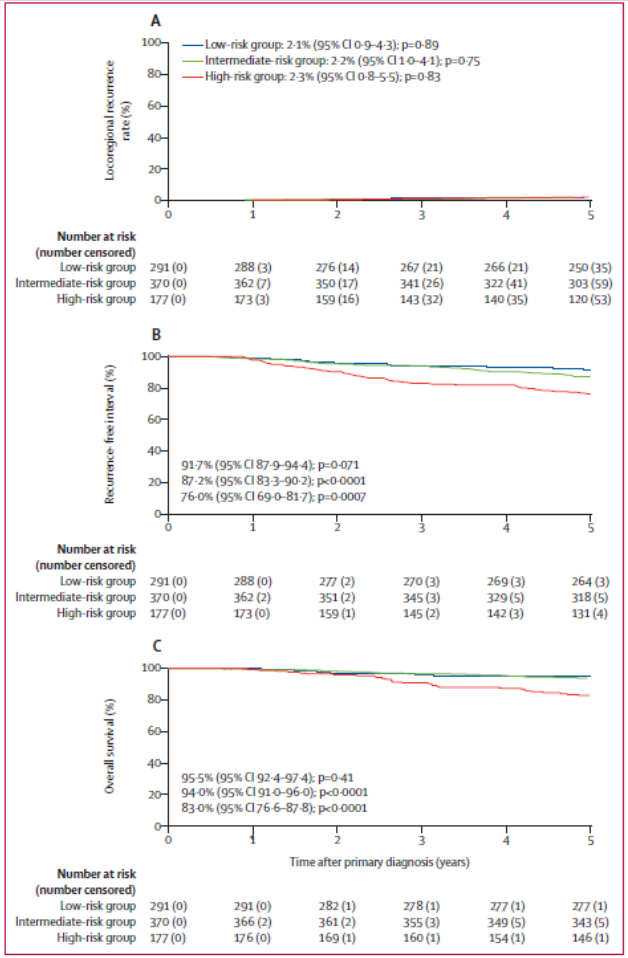


*Figure 2:* **5-year follow-up results per risk group**
(A) 5-year locoregional recurrence (without synchronous distant metastases). (B) 5-year recurrence-free interval. (C) 5-year overall survival.

# ¿Se deben irradiar TODAS las áreas ganglionares en pacientes N+ que pasan a ypN0?

# ¿Podemos sustituir la linfadenectomía quirúrgica por la irradiación ganglionar en los casos de ypN+?

**NSABP-B**

A Randor
Post-Mast
XRT and
in Patient
Neoadjuv
Pathologi
Neoadjuv

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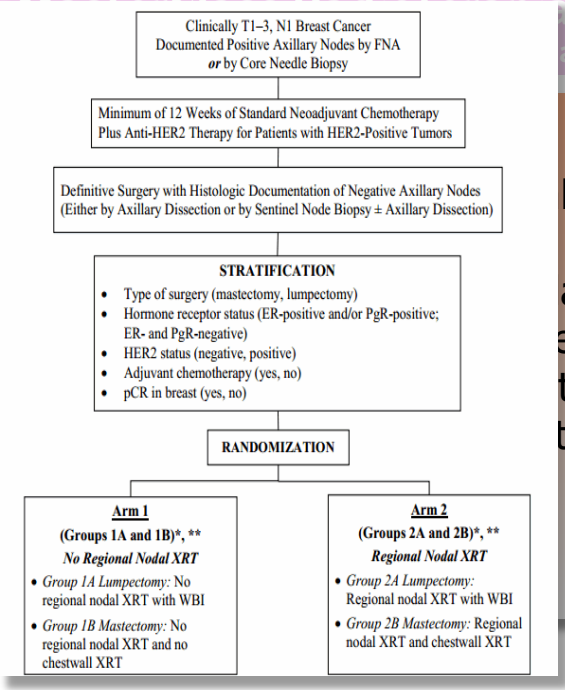


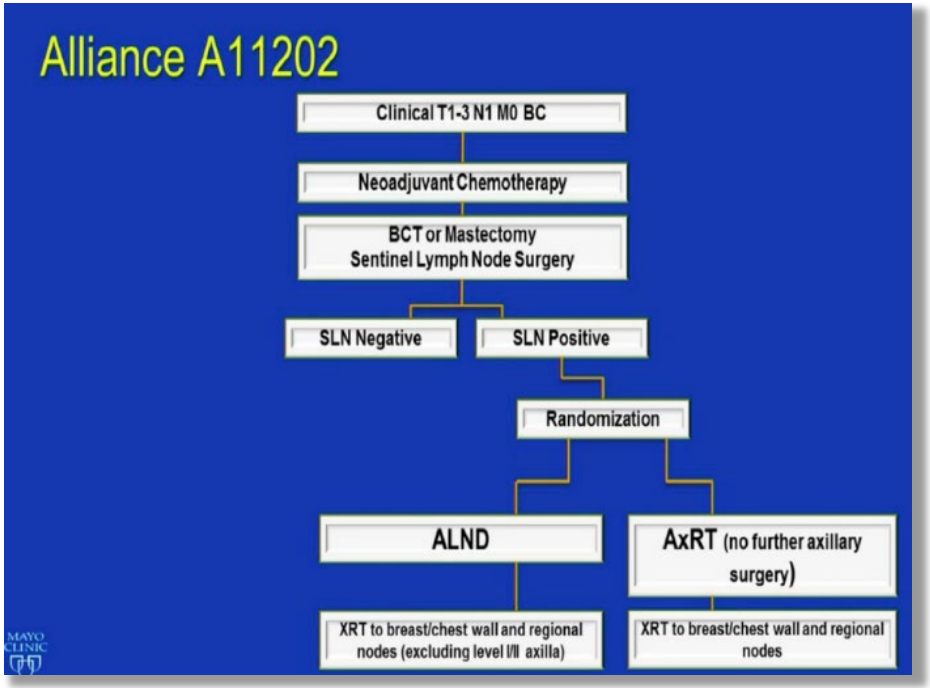


## Regional Nodal RT

*Undissected axilla*, supraclavicular nodes,internal mammary nodes

## "Amaros after PST"

frontiers | Frontiers in Oncology

TYPE Study Protocol
PUBLISHED 09 August 2023
DOI 10.3389/fonc.2023.1184021

Check for updates

OPEN ACCESS

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RECEIVED 10 March 2023
ACCEPTED 04 July 2023
PUBLISHED 09 August 2023

CITATION
García-Tejedor A, Ortega-Exposito C, Salinas S, Luzardo-González A, Falo C, Martínez-Pérez E, Pérez-Montero H, Soler-Monsó MT, Bajen M-T, Benitez A

# Axillary lymph node dissection versus radiotherapy in breast cancer with positive sentinel nodes after neoadjuvant therapy (ADARNAT trial)

Amparo García-Tejedor[1*], Carlos Ortega-Exposito[1], Sira Salinas[2], Ana Luzardo-González[2], Catalina Falo[3], Evelyn Martínez-Pérez[4], Héctor Pérez-Montero[4], M. Teresa Soler-Monsó[5], Maria-Teresa Bajen[6], Ana Benitez[6], Raul Ortega[7], Anna Petit[5], Anna Guma[7], Miriam Campos[1], Maria J. Plà[1], Sonia Pernas[3], Judith Peñafiel[8], Carlos Yeste[9], Miguel Gil-Gil[3], Ferran Guedea[4], Jordi Ponce[1] and Maria Laplana[4]

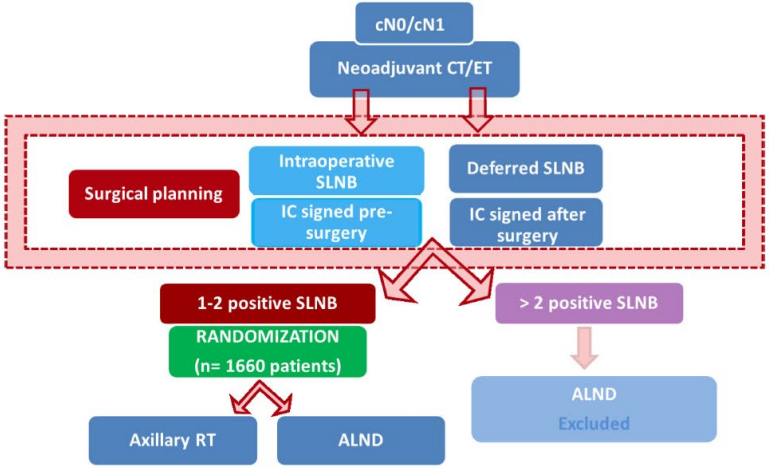


FIGURE 1
Schedule. CT, Chemotherapy; ET, Endocrine Therapy; SLNB, Sentinel Lymph Node Biopsy; IC, Informed Consent; RT, Radiotherapy; ALND, Axillary Lymph Node Dissection.

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DEC 5-9, 2023
SAN ANTONIO BREAST CANCER SYMPOSIUM

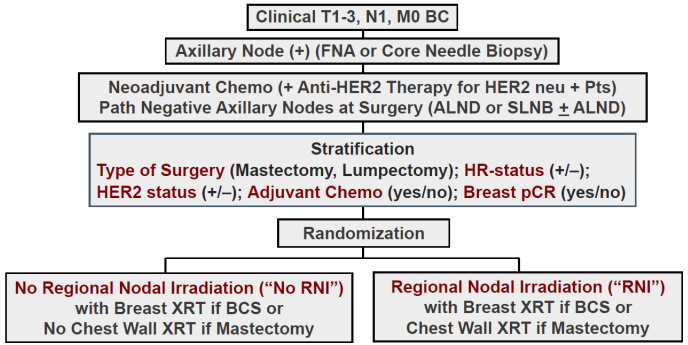
# Loco-regional Irradiation in Patients with Biopsy-proven Axillary Node Involvement at Presentation Who Become Pathologically Node-negative After Neoadjuvant Chemotherapy: Primary Outcomes of NRG Oncology/NSABP B-51/RTOG 1304

Eleftherios P. Mamounas[1*], Hanna Bandos[2], Julia R. White[3*], Thomas B. Julian[4], Atif J. Khan[5], Simona F. Shaitelman[6], Mylin A. Torres[7], Frank A. Vicini[8], Patricia A. Ganz[9], Susan A. McCloskey[10], Peter C. Lucas[11,12], Nilendu Gupta[3], X. Allen Li[13], Beryl McCormick[5], Saumil Gandhi[6], Rahul D. Tendulkar[14], Vivek S. Kavadi,[15], Masahiko Okamoto[16], Samantha Andrews Seaward[17], William J. Irvin, Jr.[18], Jolinta Lin [7], Robert Mutter[19], Thierry M. Muanza[20], Andrew A. Muskovitz[21], Reshma Jagsi[22], Anna C. Weiss[23,24], Walter J. Curran, Jr.[7], and Norman Wolmark[12]

*These authors contributed equally.



## Study Schema




Regional Nodal RT: *Undissected axilla*, supraclavicular nodes, IMC

## Objectives

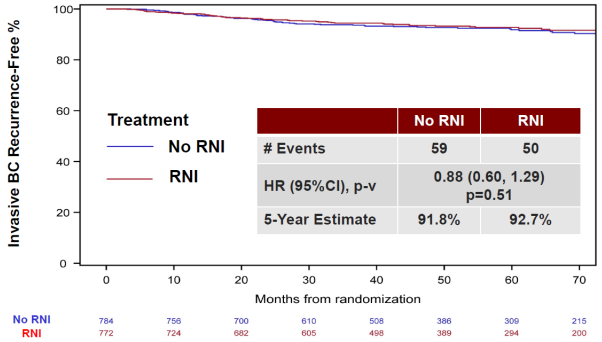
- The **primary objective** of the study was to evaluate whether CWI+RNI after mastectomy or WBI+RNI after lumpectomy significantly improves **Invasive Breast Cancer Recurrence-free Interval (IBCRFI)** in cN+ pts found to be ypN0 after NAC
  - IBCRFI was defined as time from randomization until invasive local, regional, or distant recurrence, or death from breast cancer
- Secondary objectives (reported here) were to evaluate the effect of RNI on:
  - Loco-regional Recurrence-free Interval (LRRFI)
  - Distant Recurrence-free Interval (DRFI)
  - Disease-free Survival (DFS)
  - Overall Survival (OS)
  - Toxicity

## Baseline Characteristics (2)

| Characteristic | | No RNI (%) n=821 | RNI (%) n=820 |
|---|---|---|---|
| Tumor Subtype | Triple-negative | 21 | 23 |
| | ER+ and/or PR+/HER2- | 22 | 20 |
| | ER- and PR-/HER2+ | 25 | 24 |
| | ER+ and/or PR+/HER2+ | 31 | 33 |
| Breast Surgery | Lumpectomy | 58 | 58 |
| | Mastectomy | 42 | 42 |
| Axillary Surgery | SLNB | 55 | 56 |
| | ALND (+/-SLNB) | 45 | 44 |
| pCR in Breast | No | 22 | 21 |
| | Yes | 78 | 79 |
| Adjuvant Chemotherapy | No | 100 | 99 |
| | Yes | <1 | 1 |

## Primary Endpoint

### Invasive Breast Cancer Recurrence-free Interval (IBCRFI)



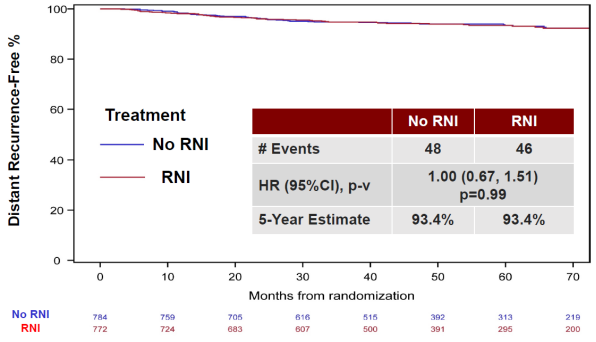

| | No RNI | RNI |
|---|---|---|
| # Events | 59 | 50 |
| HR (95%CI), p-v | 0.88 (0.60, 1.29) p=0.51 | |
| 5-Year Estimate | 91.8% | 92.7% |





## Secondary Endpoints (cont.)

### Distant Recurrence-free Interval (DRFI)



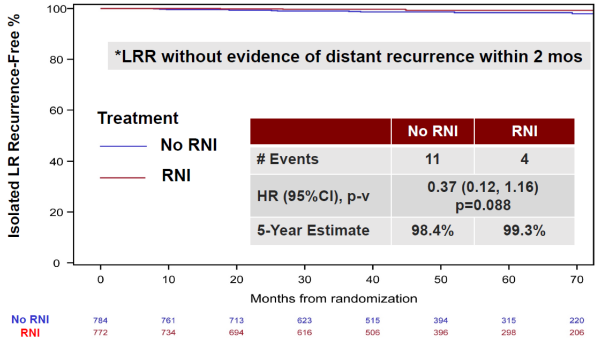

| | No RNI | RNI |
|---|---|---|
| # Events | 48 | 46 |
| HR (95%CI), p-v | 1.00 (0.67, 1.51) p=0.99 | |
| 5-Year Estimate | 93.4% | 93.4% |





## Secondary Endpoints

### Isolated Loco-Regional Recurrence-free Interval (ILRRFI)*



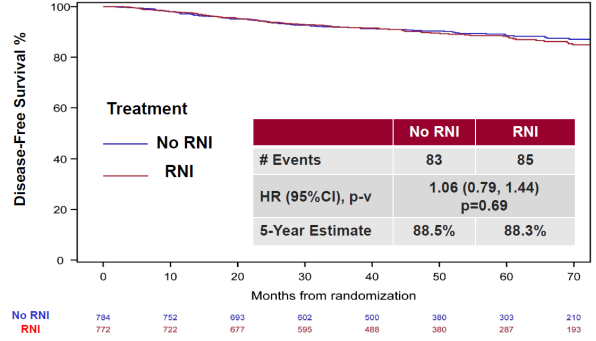

| | No RNI | RNI |
|---|---|---|
| # Events | 11 | 4 |
| HR (95%CI), p-v | 0.37 (0.12, 1.16) p=0.088 | |
| 5-Year Estimate | 98.4% | 99.3% |





## Secondary Endpoints (cont.)

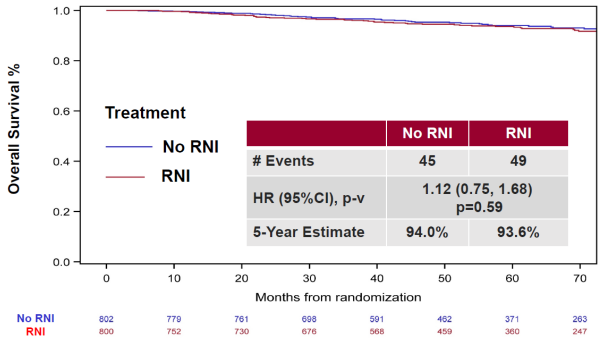
### Disease-free Survival (DFS)




| | No RNI | RNI |
|---|---|---|
| # Events | 83 | 85 |
| HR (95%CI), p-v | 1.06 (0.79, 1.44) p=0.69 | |
| 5-Year Estimate | 88.5% | 88.3% |

## Secondary Endpoints (cont.)

### Overall Survival (OS)




| | No RNI | RNI |
|---|---|---|
| # Events | 45 | 49 |
| HR (95%CI), p-v | 1.12 (0.75, 1.68) p=0.59 | |
| 5-Year Estimate | 94.0% | 93.6% |




## Conclusions

- In patients who present with biopsy-proven axillary node involvement (cN+) and convert their axillary nodes to ypN0 after NAC, CWI+RNI after mastectomy, or WBI+RNI after lumpectomy, did not improve the 5-year IBCRFI, LRRFI, DRFI, DFS, or OS
- These findings suggest that downstaging involved axillary nodes with neoadjuvant chemotherapy can optimize adjuvant radiotherapy use without adversely affecting oncologic outcomes
- Follow-up of patients for long-term outcomes continues




- **La irradiación ganglionar de todos los niveles, en pacientes con remisión completa ganglionar tras TSP, no mejora la recidiva local, a distancia, supervivencia libre de enfermedad o supervivencia global a 5 años.**
- **Incluye pacientes con linfadenectomía (45%)**
- **Este hecho puede ayudar a *optimizar* la radioterapia adyuvante**
- **Las características de la irradiación se están analizando**
- **Irradiación incidental ?**

# OPTIMAL IIa NCT[illegible]

Quimioterapia
Biológicos
Hormonoterapia

N+ ➡ TSP

Se acepta fraccionamiento clásico e hipofraccionamiento

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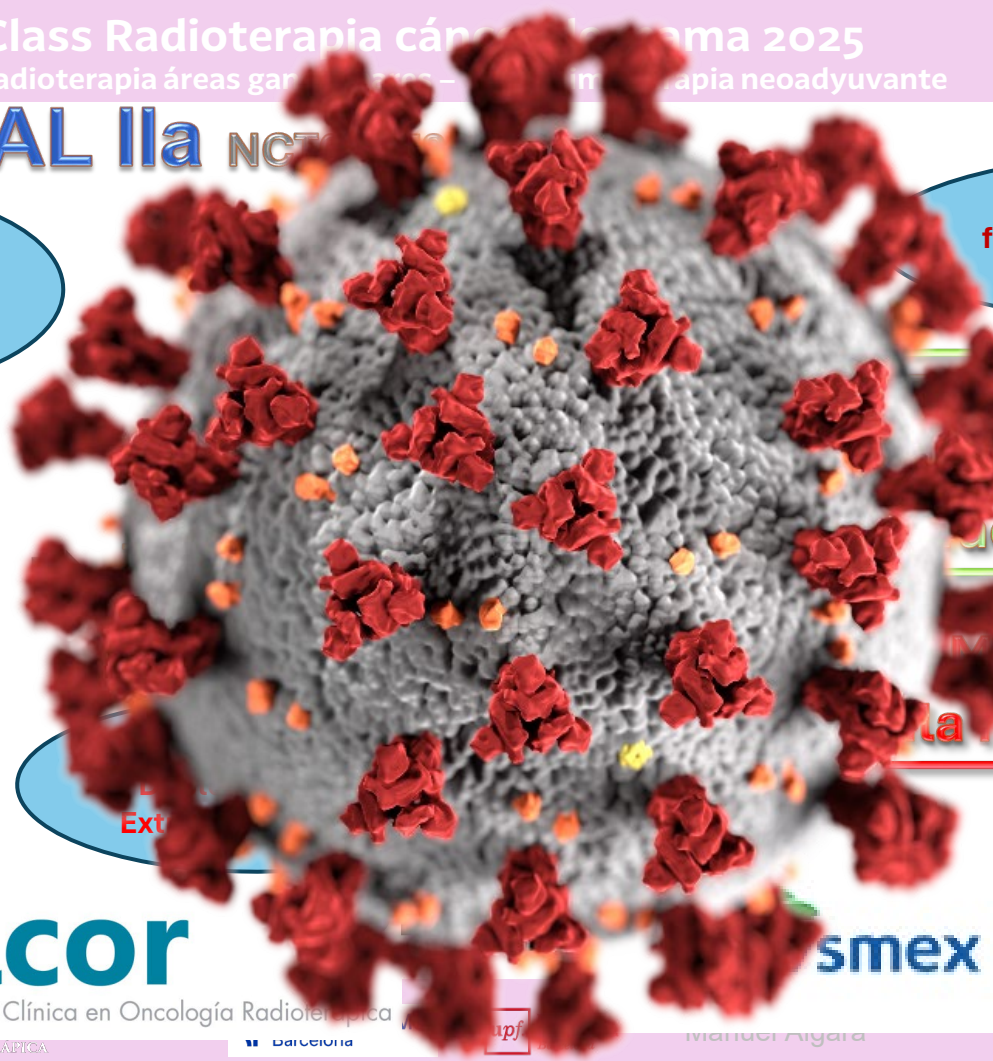

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# RNI Post-PCR

**(NSABP B-51 / RTOG 1304)**


Department of Radiation Oncology

Associate Director for Clinical Affairs
Simon Comprehensive Cancer Center
Indiana University School of Medicine


## IBCRFI – Exploratory Subgroup Analysis

| Variable | | No RNI (D/N) | No RNI 5-y est (%) | RNI (D/N) | RNI 5-y est (%) | HR (95% CI) | P-interaction |
|---|---|---|---|---|---|---|---|
| | All patients | 59/784 | 91.8 | 50/772 | 92.7 | 0.88 (0.60,1.28) | |
| Age | <=49 | 18/311 | 92.8 | 24/312 | 92.0 | 1.37 (0.74,2.54) | 0.09 |
| | 50-59 | 25/257 | 90.4 | 12/254 | 94.4 | 0.51 (0.25,1.03) | |
| | >= 60 | 16/216 | 92.4 | 14/206 | 91.7 | 0.96 (0.46,1.99) | |
| Race | Black | 11/135 | 92.6 | 8/140 | 93.4 | 0.70 (0.27,1.77) | 0.69 |
| | White | 40/543 | 91.6 | 36/533 | 92.1 | 1.00 (0.63,1.57) | |
| | Other | 8/106 | 91.8 | 6/99 | 95.3 | 0.84 (0.28,2.52) | |
| | Triple-negative | 8/169 | 95.0 | 19/188 | 88.4 | 2.30 (1.00,5.25) | 0.037 |
| | ER/PR+/HER2- | 17/173 | 90.5 | 7/155 | 94.0 | 0.41 (0.17,0.99) | |
| Axillary Surgery | Axil +/- SLNB | 27/357 | 92.0 | 25/338 | 91.8 | 1.02 (0.59,1.75) | 0.42 |
| | SLNB alone | 32/427 | 91.5 | 25/434 | 93.5 | 0.75 (0.44,1.26) | |

0.125 0.25 0.5 1 2 4 8

Favors RNI — Favors No RNI



## IBCRFI – Subgroup Analysis by Stratification Factors

| Variable | | No RNI (D/N) | No RNI 5-y est (%) | RNI (D/N) | RNI 5-y est (%) | HR (95% CI) | P-interaction |
|---|---|---|---|---|---|---|---|
| | All patients | 59/784 | 91.8 | 50/772 | 92.7 | 0.88 (0.60,1.28) | |
| Surgery | Lumpectomy | 26/454 | 93.5 | 28/454 | 92.8 | 1.08 (0.63,1.84) | 0.28 |
| | Mastectomy | 33/330 | 89.5 | 22/318 | 92.6 | 0.72 (0.42,1.23) | |
| ER/PR | Negative | 28/367 | 91.7 | 31/371 | 90.4 | 1.12 (0.67,1.86) | 0.17 |
| | Positive | 31/417 | 92.1 | 19/401 | 94.9 | 0.66 (0.37,1.16) | |
| HER2 | Negative | 25/342 | 92.6 | 26/343 | 90.9 | 1.01 (0.59,1.76) | 0.47 |
| | Positive | 34/ | | | | 0.77 | |
| pCR breast | No | 20/ | | | | | |
| | Yes | 39/ | | | | | |
| | Triple-negative | 8/169 | 95.0 | 19/188 | 88.4 | 2.30 (1.00,5.25) | |
| Adjuvant Chemotherapy | No | 57/780 | 92.1 | 50/766 | 92.7 | 0.92 (0.63,1.34) | |
| | Yes | 2/4 | | 0/6 | | | |

0.125 0.25 0.5 1 2 4 8

Favors RNI — Favors No RNI



## IBCRFI – Exploratory Subgroup Analysis

| Variable | | No RNI (D/N) | No RNI 5-y est (%) | RNI (D/N) | RNI 5-y est (%) | HR (95% CI) | P-interaction |
|---|---|---|---|---|---|---|---|
| | All patients | 59/784 | 91.8 | 50/772 | 92.7 | 0.88 (0.60,1.28) | |
| Age | <=49 | 18/311 | 92.8 | 24/312 | 92.0 | 1.37 (0.74,2.54) | 0.09 |
| | 50-59 | 25/257 | 90.4 | 12/254 | 94.4 | 0.51 (0.25,1.03) | |
| | >= 60 | 16/216 | 92.4 | 14/206 | 91.7 | 0.96 (0.46,1.99) | |
| Race | Black | 11/135 | 92.6 | 8/140 | 93.4 | 0.70 (0.27,1.77) | 0.69 |
| | White | 40/543 | 91.6 | 36/533 | 92.1 | 1.00 (0.63,1.57) | |
| | Other | 8/106 | 91.8 | 6/99 | 95.3 | 0.84 (0.28,2.52) | |
| | Triple-negative | 8/169 | 95.0 | 19/188 | 88.4 | 2.30 (1.00,5.25) | |
| | ER/PR+/HER2+ | 14/244 | 93.3 | 12/246 | 95.7 | 0.99 (0.46,2.14) | |
| Axillary Surgery | Axil +/- SLNB | 27/357 | 92.0 | 25/338 | 91.8 | 1.02 (0.59,1.75) | 0.42 |
| | SLNB alone | 32/427 | 91.5 | 25/434 | 93.5 | 0.75 (0.44,1.26) | |

0.125 0.25 0.5 1 2 4 8

Favors RNI — Favors No RNI

## Why?

- Publication is pending
  - Breast pCR by subtype
  - Recurrence site by subtype
  - Per protocol treatment assessment
- Statistical Anomaly
- Spurious finding?
- *Maybe it is real……*

**Será todo por los TILS?**
**El subtipo influye ?**

## Perhaps…….

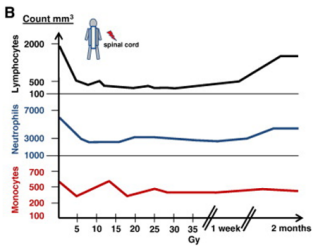
- NAC
  - Selected for chemo-resistant (cr)TNBC
  - Elevated TILs

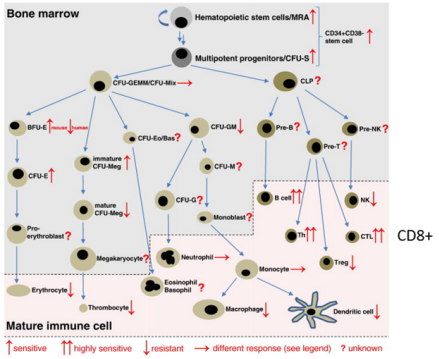
No RNI cohort

  - Elevated TILs kill the crTNBC - few recurrences
- RNI cohort
  - Radiation decreases TILs
  - crTNBC survives - more recurrences

## Radiosensitivity of Lymphocytyes, Stem, Progenitor Cells

Heylmann et al. Biochem Biophys Acta 2014




## Perhaps……

Radiation's negative effects on TILs, may have removed TILs' cytotoxic restraints on TNBC resulting in higher recurrence rates than in non-RNI group. A negative abscopal effect?

- San Antonio Theory

SAN ANTONIO BREAST CANCER SYMPOSIUM®

DECEMBER 10–13, 2024

HENRY B. GONZALEZ CONVENTION CENTER • SAN ANTONIO, TX

# Factors Influencing Additional Nodal Disease and Pathologic Nodal Upstaging with Axillary Dissection in Patients with Residual Node-Positive Breast Cancer After Neoadjuvant Chemotherapy Enrolled on Alliance A011202 Clinical Trial

ALLIANCE FOR CLINICAL TRIALS IN ONCOLOGY

Judy C. Boughey M.D., Vera Suman, Ph.D., Kelly J. Hunt, M.D., Bruce G. Haffty, M.D., M.S., Thomas Buchholz, M.D., W. Fraser Symmans, MBChB., Tracy L. Rieken, Travis J. Dockter, Jordan D. Campbell, Anna Weiss, M.D., Julie A. Bradley, M.D., MHCDS, Joshua M. V. Mammen, M.D., Ph.D., Ann H. Partridge, M.D., MPH, Lisa A. Carey, M.D.

San Antonio Breast Cancer Symposium, December 12th 2024



369 sites from 2014-2022

4279 patients pre-registered (cN1 pre-NAC)

↓

2012 registered to the trial (pN+ disease on SLN +/- TAD)

↓ positive node defined as metastasis ≥ 0.2 mm

1736 eligible & randomized

↙ ↘

841 patients (48.4%) ALND

895 patients (51.6%) No ALND





## A11202 Trial Schema

Clinically T1-3 N1 M0 Breast Cancer
Axillary Ultrasound with FNA or Core Biopsy Documenting Positive lymph Nodes

↓

Neoadjuvant Chemotherapy Completed (minimum of 4 cycles),
Clinically Negative Axilla After Neoadjuvant Chemotherapy

↓

Surgery with Sentinel Lymph Node Surgery/Targeted Axillary Dissection

↙ ↘

ARM 1
ALND + Nodal XRT
(without XRT to Dissected Axilla)

ARM 2
Axillary XRT and Nodal XRT

**1º endpoint - DRFI**





## Aim

- Evaluate the nodal burden at SLN surgery in A11202 patients
- In the ALND group evaluate:
  - Additional positive nodes
  - Factors associated with additional positive nodes
  - Nodal upstaging

Clinically T1-3 N1 M0 Breast Cancer
Axillary Ultrasound with FNA or Core Biopsy Documenting Positive lymph Nodes

↓

Neoadjuvant Chemotherapy Completed (minimum of 4 cycles),
Clinically Negative Axilla After Neoadjuvant Chemotherapy

↓

Surgery with Sentinel Lymph Node Surgery/TAD

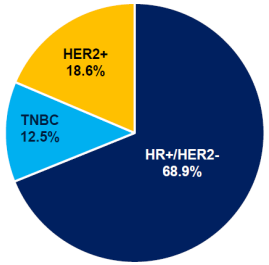
↙ ↘

ARM 1
ALND + Nodal XRT
(without XRT to Dissected Axilla)

ARM 2
Axillary XRT and Nodal XRT

| | | ALND (n=841) | AxRT (n=895) |
|---|---|---|---|
| Age Group, n (%) | <50 | 372 (44.2%) | 416 (46.5%) |
| | 50-59 | 251 (29.8%) | 267 (29.8%) |
| | 60-69 | 172 (20.5%) | 165 (18.4%) |
| | 70+ | 46 (5.5%) | 47 (5.3%) |
| Gender, n (%) | Female | 837 (99.5%) | 893 (99.8%) |
| | Male | 4 (0.5%) | 2 (0.2%) |
| Race, n (%) | Not reported | 53 (6.3%) | 55 (6.1%) |
| | American Indian or Alaskan Native | 6 (0.7%) | 0 (0.0%) |
| | Asian | 36 (4.3%) | 40 (4.5%) |
| | Black or African American | 127 (15.1%) | 150 (16.8%) |
| | Native Hawaiian or Pacific Islander | 2 (0.2%) | 2 (0.2%) |
| | White | 617 (73.4%) | 648 (72.4%) |
| Histologic Type, n (%) | Infiltrating ductal | 695 (82.7%) | 748 (83.6%) |
| | Infiltrating lobular | 60 (7.1%) | 59 (6.6%) |
| | Mixed ductal/lobular | 37 (4.4%) | 31 (3.5%) |
| | Other | 48 (5.7%) | 57 (6.4%) |
| | Not provided | 1 | 0 |
| Clinical T Category, n (%) | T1 | 154 (18.3%) | 179 (20.0%) |
| | T2 | 501 (59.6%) | 512 (57.2%) |
| | T3 | 186 (22.1%) | 204 (22.8%) |
| Histologic Grade, n (%) | High | 350 (41.6%) | 342 (38.3%) |
| | Intermediate | 403 (47.9%) | 456 (51.0%) |
| | Low | 73 (8.7%) | 77 (8.6%) |
| | Unknown | 15 (1.8%) | 20 (2.1%) |

### Tumor Subtype








## Impact of ALND on ypN category

ALND resulted in pathologic nodal upstaging in 25.4% of patients

- Increase from ypN1 to ypN2 — 19.3% (162 patients)
- Increase from ypN1 to ypN3 — 3.8% (32 patients)
- Increase from ypN2 to ypN3 — 2.4% (20 patients)
- No change in stage — 74.6%

Did not vary by number of SLNs examined





## Additional Positive Nodes on ALND

**Factors NOT significantly associated**

- Patient Age
- Palpable Nodes at Diagnosis
- Tumor Biologic Subtype
- SLN micro/macrometastasis
- Localized resection of clipped node

**Factors significantly associated**

- cT3 at diagnosis
- Residual breast disease - ypT3
- Mastectomy
- ⬆ # of positive SLNs
- ⬆ # of additional nodes on ALND

On MVA - **# of positive SLNs**, **ypT category** and **number of additional nodes removed on ALND** were associated with additional positive nodes





## Increase in ypN category on ALND by tumor subtype

- HER2+ — 17.5% (27/154)
- TNBC — 22.37% (23/103)
- HR+/HER2- — 28.1% (164/584)

p = 0.34 (HER2+ vs TNBC)
p = 0.28 (TNBC vs HR+/HER2-)
p = 0.007 (overall)

San Antonio Breast Cancer Symposium, December 10-13, 2024

# Summary

- Patients in A11202 had predominantly HR+/Her2- disease
- Rate of additional positive nodes on ALND was 46%
  - Higher than the 27% in Z11 and 33% in AMAROS
- Likelihood of additional positive nodes on ALND influenced by;
  - # of positive SLNs, ypT3 disease and number of LNs removed at ALND
- ALND led to upstage of nodal stage in 25%
  - All subtypes – greatest in HR+/Her2-

**Data from A11202 are awaited regarding oncologic outcomes with omission of ALND**

+Model
SENOL-116; No. of Pages 3
ARTICLE IN PRESS
Rev Senol Patol Mamar. 2015;xxx(xx):xxx–xxx
Revista de Senología y Patología Mamaria
www.elsevier.es/senologia
ELSEVIER

EDITORIAL

Manejo de la axila en el cáncer de mama: menos es más, más es menos o todo lo contrario

Management of the axilla in breast cancer: Less is more, more is less or the other way around

Ángel Montero Luis[a,c,*] y Manuel Algara López[b,c]
[a] Oncología Radioterápica, Hospital Universitario HM Sanchinarro, Madrid, España
[b] Oncología Radioterápica, Parc de Salut Mar, Universitat Pompeu Fabra, Barcelona, España
[c] Grupo Español de Oncología Radioterápica en Mama (GEORM), España

En conclusión, teniendo en cuenta la bibliografía publicada, la ausencia de estudios que demuestren lo contrario y a la espera de los resultados de ensayos actualmente en marcha, en las pacientes con afectación ganglionar axilar es recomendable la irradiación de las áreas ganglionares, tal y como se define en el consenso español[13], en las recomendaciones de expertos[14] y en las guías internacionales.

Debemos ser prudentes, las guías y los expertos lo recomiendan

Breast Cancer Res Treat
DOI 10.1007/s10549-017-4522-z
CrossMark
BRIEF REPORT

A need for biology-driven personalized radiotherapy in breast cancer

Pelagia G. Tsoutsou[1,2,3] · André-Dante Durham[2,3] · Marie-Catherine Vozenin[2,3]

**Sin perder la más mínima posibilidad de curación**



BREAST CANCER

Debating the Optimal Approach to Nodal Management After Pathologic Complete Response to Neoadjuvant Chemotherapy in Patients With Breast Cancer

Stacey Carter, MD[1]; Heather Neuman, MD, MS, FACS[2]; Eleftherios P. Mamounas, MD, MPH[3]; Isabelle Bedrosian, MD, FACS[4]; Stacy Moulder, MD, MSCI[5]; Alberto J. Montero, MD, MBA[6]; and Reshma Jagsi, MD, DPhil[7]

- No todas las pacientes con enfermedad axilar confirmada por biopsia antes de TSP necesitan una linfadenectomía
- La BSGC en el entorno post-TSP debe minimizar los falsos negativos. Deben marcarse los ganglios biopsiados y confirmar su exéresis. Usar doble trazador y extraer un mínimo de 2 ganglios
- **El desescalado terapéutico debe ser seguro ya que se pretende maximizar el control de la enfermedad minimizando las toxicidades.**
- No se conoce el enfoque local óptimo de la axila ni quirúrgico ni radioterápico

# MasterClass Radioterapia cáncer de mama 2025

## 2ª Sesión: Radioterapia áreas ganglionares – Tras quimioterapia neoadyuvante

| Antes | Después | Radioterapia ganglionar |
|---|---|---|
| | | |
| | | |

**Edad, tamaño tumoral, infiltración linfovascular, receptores estrogénicos, her2, KI67, subtipo molecular, nuevas herramientas pueden ayudar**


NO MORE EXCUSES

# Association of VMAT vs 3D-CRT Radiotherapy Treatment Technique with Acute Toxicity of Regional Nodal Irradiation: A Secondary Analysis of the SAPHIRe Phase III Randomized Clinical Trial (PS6-02)

C. R. Goodman[1], M. P. Mitchell[1], S. Ramezani[2], S. F. Shaitelman[1], R. Z. Fnu[1], I. Y. Arzu[2], E. Bloom[1], C.D. Fuller[2], M. M. Joyner[1], L. L. Mayo[2], K. Nead[1], G. H. Perkins[1], J. Reddy, P. Singh[3], M. C. Stauder[2], E. A. Strom[2], V. K. Reed[2], P. J. Schlembach[2], W. A. Woodward[1], B. D. Smith[1], K. E. Hoffman[1]

[1]Department of Breast Radiation Oncology; [2]Department of Radiation Oncology; [3]Department of Breast Surgical Oncology, UT MD Anderson Cancer Center

## INTRODUCTION

- Regional nodal irradiation (RNI) improves breast cancer survival but is associated with treatment-related toxicity.
- Volumetric Modulated Arc Therapy (VMAT) treatment technique has been shown in other disease sites to improve dose homogeneity while reducing side effects compared to 3-Dimensional Conformal Radiation Therapy (3D-CRT).
- To prospectively evaluate the association of RT technique with acute toxicity, we performed a secondary analysis of the SAPHIRe trial, a randomized Phase III trial evaluating evaluating conventional fractionation (CFx) versus hypofractionation (HFx).

## STUDY DESIGN

- A total of 656 patients with available RT variables and end of RT toxicity assessments were enrolled from 2017-2024 with a median follow-up of 41 months, IQR = 27-65.

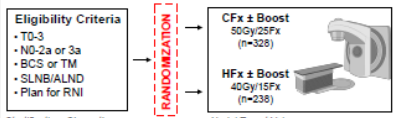



**Figure 1.** SAPHIRe trial eligibility and study schema.

- Acute RT-related toxicity was graded utilizing the NCI CTCAE v4.0 scale at the end of RT.
- One-to-one nearest-neighbor propensity score-matching was performed to generate well-balanced matched cohorts of patients based on RT treatment technique (3D-CRT vs. VMAT).
- Associations between treatment technique with clinicopathologic and treatment variables, dosimetric data, and toxicity endpoints were determined using the Fisher's Exact, Mann-Whitney U, Kruskal-Wallis tests, and Dunn's test with Bonferroni correction for multiple comparisons as appropriate.
- Univariate analysis and multivariable binomial logistic regression were performed to calculate adjusted odds ratios (OR) for factors associated with Grade 2+ toxicity at the end of RT.

## RESULTS

| Variable | 3D-CRT (N=196) | VMAT (N=196) | P |
|---|---|---|---|
| **BMI**, Median [IQR] | 28 [25-34] | 29 [25-34] | 0.42 |
| **Hypofractionation** (*vs CFx*), N (%) | 105 (54%) | 109 (56%) | 0.76 |
| **Reconstruction Pre-RT**, N (%) | | | 0.78 |
| None/Delayed | 121 (62%) | 118 (60%) | |
| TE (Pre-RT) | 68 (35%) | 73 (37%) | |
| Implant (Pre-RT) | 7 (4%) | 5 (3%) | |
| **Node positive**, N (%) | 115 (59%) | 115 (59%) | 1.00 |
| **Subtype**, N (%) | | | 0.70 |
| HR+ Her2- | 116 (59%) | 124 (63%) | |
| Her2+ | 47 (24%) | 40 (20%) | |
| TNBC | 36 (18%) | 32 (16%) | |
| **Mastectomy** (*vs BCS*), N (%) | 110 (56%) | 119 (61%) | 0.56 |
| **ALND** (*vs SLNB*), N (%) | 132 (63%) | 123 (63%) | 1.00 |
| **Chemotherapy**, N (%) *vs None* | | | 0.86 |
| Neoadjuvant | 113 (58%) | 121 (59%) | |
| Adjuvant | 47 (23%) | 47 (23%) | |
| None | 36 (18%) | 37 (18%) | |
| **Boost (CW or Nodes)**, N (%) | 177 (90%) | 181 (92%) | 0.59 |
| **Boost (Nodes)**, N (%) | 10 (5%) | 11 (6%) | 1.00 |

**Table 1.** Selected baseline characteristics of propensity-score matched cohorts by RT technique (3D-CRT versus VMAT).

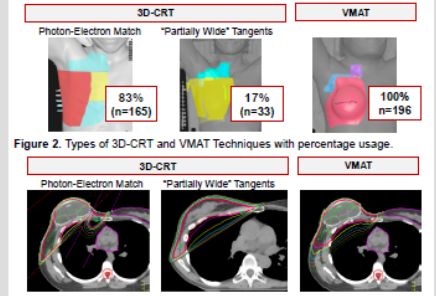



**Figure 2.** Types of 3D-CRT and VMAT Techniques with percentage usage.




**Figure 3.** Representative example treatment plans using 3D technique (Photon-Electron Match; "Partially Wide" Tangents) and VMAT technique (Right).

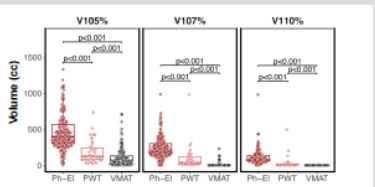



**Figure 4.** Association of total volume (cc) receiving 105%, 107%, and 110% of prescribed dose with treatment plan technique. Ph-EI: Photon-Electron (n=165); PWT: Partially-Wide Tangent (n=33); VMAT (n=196).

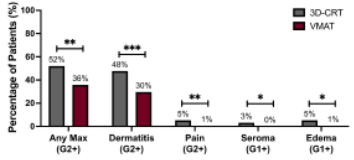



**Figure 5.** Association of treatment technique (3D-CRT versus VMAT) with acute toxicity (CTCAE): Maximum (Grade 2+ Toxicity), Dermatitis (Grade 2+), Pain (Grade +), Seroma (Grade 1+), Edema (Grade 1+).

| Dosimetric Constraint | Photon-Electron Match (n=165) | "Partially Wide" Tangents (n=33) | VMAT (n=196) | P |
|---|---|---|---|---|
| Dmax, Nodal Target Volumes (%) | 121% [116-127%] | 113% [109-121%] | 106% [105-108%] | <0.001 |
| Dmax, Brachial Plexus (%) | 105% [102-108%] | 104% [102-105%] | 99% [97-101%] | <0.001 |

**Table 2.** Association of maximum dose (% of prescribed dose) to the nodal target volumes and brachial plexus with treatment plan technique. treatment technique (3D: Photon-Electron Match, "Partially Wide" Tangents versus VMAT),

## RESULTS

| Variable | Odd's Ratio [95% CI] | Rates of G2+ Toxicity | P |
|---|---|---|---|
| BMI *(per point inc.)* | 1.07 [1.03-1.11] | Increased | p=0.001 |
| Non-Hispanic *(vs Hispanic)* | 2.05 [1.12-3.83] | Increased | p=0.02 |
| HFx *(vs CFx)* | 0.19 [0.12-0.31] | Decreased | p<0.001 |
| VMAT (vs 3D-CRT) | 0.44 [0.28-0.70] | Decreased | p<0.001 |
| No Boost *(vs Boost)* | 0.26 [0.10-0.68] | Decreased | p=0.008 |
| Pre-RT Reconstruction *(TE/Implant versus None)* | 1.31 [0.70-2.45] | No Change | p=0.40 |

**Table 3.** Multivariable Analysis of association of clinicopathologic and treatment variables with acute toxicity (any G2+ toxicity at end of RT).

## CONCLUSIONS

- Patients treated with RNI utilizing VMAT technique compared with 3D-CRT experienced significantly decreased rates of acute treatment-related toxicity, including any Grade 2+ toxicity, in the setting of improved dose homogeneity.
- Future work will include longer-term toxicity endpoints, patient-reported outcomes, and comprehensive analysis of dosimetric variables with toxicity outcomes.

## CONTACT INFORMATION

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## REFERENCES

Shortening Adjuvant PHoton IRradiation (SAPHIRe): A Randomized Trial of Hypofractionated Versus Conventionally Fractionated Regional Nodal Irradiation for Invasive Breast Cancer.
Study # 2016-0142 (UT MD Anderson Cancer Center),
Principal Investigator: Karen Hoffman, MD.
clinicaltrials.gov NCT No: NCT02912312

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

# Adjuvant Capecitabine for Breast Cancer after Preoperative Chemotherapy

N. Masuda, S.-J. Lee, S. Ohtani, Y.-H. Im, E.-S. Lee, I. Yokota, K. Kuroi, S.-A. Im, B.-W. Park, S.-B. Kim, Y. Yanagita, S. Ohno, S. Takao, K. Aogi, H. Iwata, J. Jeong, A. Kim, K.-H. Park, H. Sasano, Y. Ohashi, and M. Toi

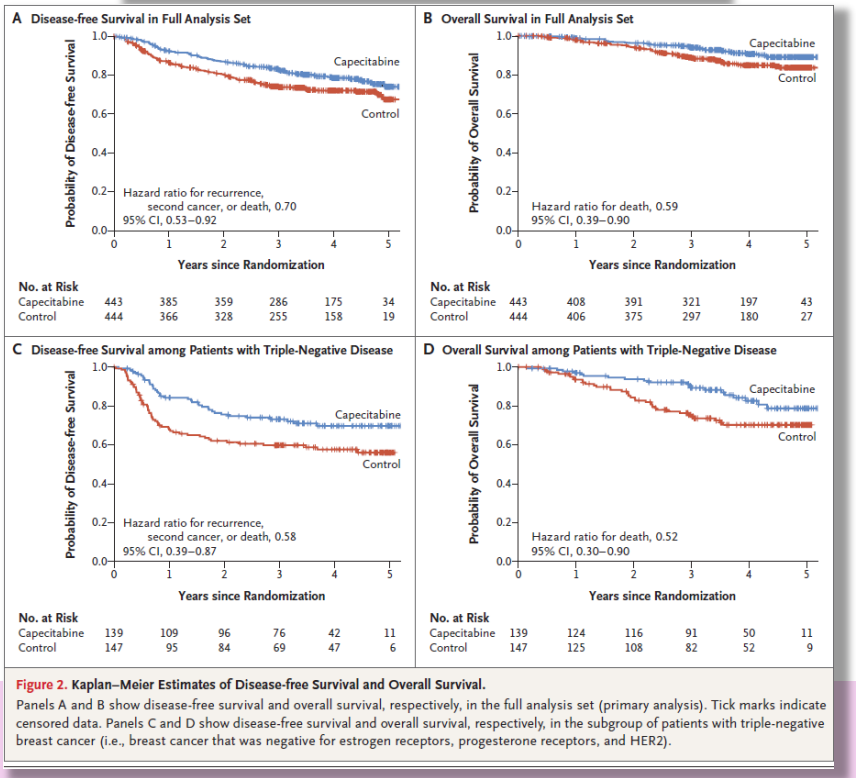



**Figure 2. Kaplan–Meier Estimates of Disease-free Survival and Overall Survival.**
Panels A and B show disease-free survival and overall survival, respectively, in the full analysis set (primary analysis). Tick marks indicate censored data. Panels C and D show disease-free survival and overall survival, respectively, in the subgroup of patients with triple-negative breast cancer (i.e., breast cancer that was negative for estrogen receptors, progesterone receptors, and HER2).



*Therapeutic Advances in Medical Oncology* — *Review*

## Post-neoadjuvant treatment and the management of residual disease in breast cancer: state of the art and perspectives

Rafael Caparica, Matteo Lambertini, Noam Pondé, Debora Fumagalli, Evandro de Azambuja and Martine Piccart

*Ther Adv Med Oncol*
2019, Vol. 11: 1–23
DOI: 10.1177/1758835919827714

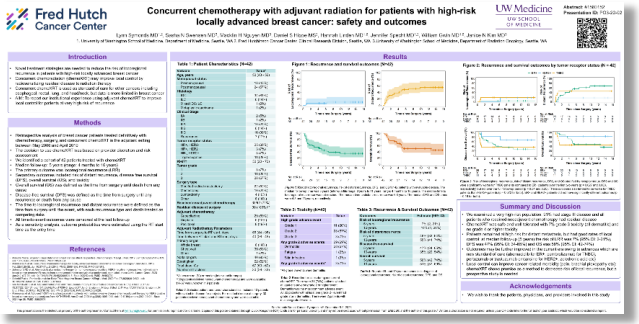


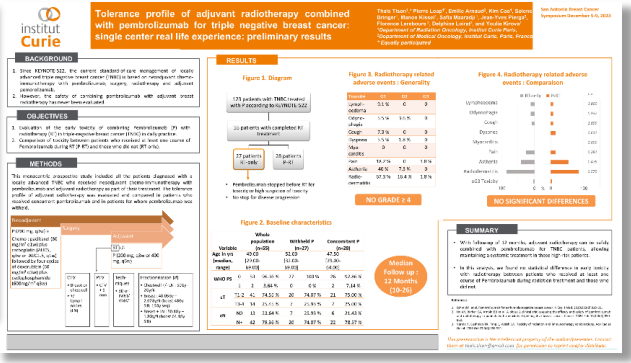
extended to eight cycles. Endocrine treatment could be administered concomitantly to capecitabine, and radiotherapy was administered either before or after capecitabine. In this trial, a signifi-

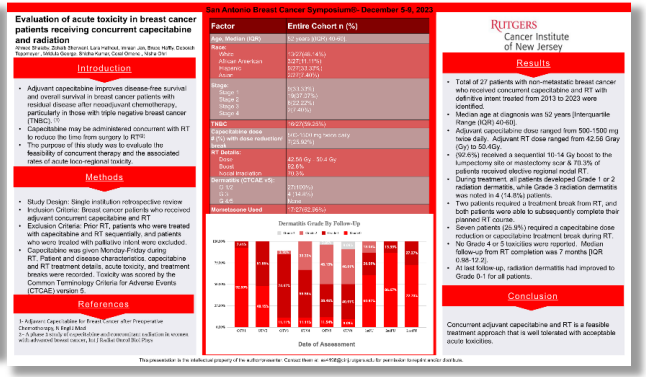
**¿Cuándo irradiamos a las pacientes que reciban también quimioterapia posterior?**

# MasterClass Radioterapia cáncer de mama 2025

## 2ª Sesión: Radioterapia áreas ganglionares – Tras quimioterapia neoadyuvante




## Summary and Discussion

- We examined a very high-risk population: 91% had stage III disease and all patients who received neoadjuvant chemotherapy had residual disease
- ChemoXRT was safe and well tolerated with 7% grade 3 toxicity (all dermatitis) and no grade 4 or higher toxicity
- Patients remained at high risk for distant metastasis, but had good rates of local control: at median follow-up (5 years) the risk of LRR was 7% (95% CI: 2-21%), DFS was 47% (95% CI: 34-65%) and OS was 56% (95% CI: 42-74%)
- Outcomes may be further improved in the current era owing to advances which are now standard of care (abemaciclib for ER+, pembrolizumab for TNBC), pertuzumab or trastuzumab emtansine for HER2+, zoledronic acid etc)
- Local control can improve cancer related morbidity (pain, brachial plexopathy etc): chemoXRT shows promise as a method to decrease risk of local recurrence, but a prospective study is needed

## SUMMARY

- With follow-up of 12 months, adjuvant radiotherapy can be safely combined with pembrolizumab for TNBC patients, allowing maintaining a systemic treatment in these high-risk patients.
- In this analysis, we found no statistical difference in early toxicity with radiotherapy between patients who received at least one course of Pembrolizumab during radiation treatment and those who did not.

## Conclusion

Concurrent adjuvant capecitabine and RT is a feasible treatment approach that is well tolerated with acceptable acute toxicities.

**La radioterapia se puede concomitar con la capecitabina (69%) cisplatino (12%) o paclitaxel (19%)**

**La radioterapia se puede concomitar con el pembrolizumab**

**La radioterapia se puede concomitar con la capecitabina**

# ¿Quedan más dudas?

Ann Surg Oncol (2025) 32:2023–2028
https://doi.org/10.1245/s10434-024-16625-7

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

ORIGINAL ARTICLE – BREAST ONCOLOGY

# Risk of Surgical Overtreatment in cN1 Breast Cancer Patients who Become ypN0 After Neoadjuvant Chemotherapy: SLNB Versus TAD

**Alison Laws, MD, MPH[1,2,3,7], Saskia Leonard, BS[4], Julie Vincuilla, BS, MPH[1], Tonia Parker, BS[1], Olga Kantor, MD, MS[1,2,3], Elizabeth A. Mittendorf, MD, PhD, MHCM[1,2,3], Anna Weiss, MD[5,6], and Tari A. King, MD[1,2,3]**

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Ann Surg Oncol
https://doi.org/10.1245/s10434-025-16952-3

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

ASO VISUAL ABSTRACT

# ASO Visual Abstract: Risk of Surgical Overtreatment in cN1 Breast Cancer Patients Who Become ypN0 After Neoadjuvant Chemotherapy: SLNB Versus TAD

**Alison Laws, MD, MPH, FRCSC[1,2,3,4], Saskia Leonard, MD[5], Julie Vincuilla, MPH[1], Tonia Parker, BS[1], Olga Kantor, MD, MS[1,2,3], Elizabeth A. Mittendorf, MD, PhD, MHCM[1,2,3], Anna Weiss, MD[6,7], and Tari A. King, MD[1,2,3]**

[1]Division of Breast Surgery, Brigham and Women's Hospital, Boston, MA; [2]Breast Oncology Program, Dana-Farber Cancer Institute, Boston, MA; [3]Harvard Medical School, Boston, MA; [4]Present Address: Department of Surgery, University of Calgary, Calgary, AB, Canada; [5]John A. Burns School of Medicine, University of Hawaii, Honolulu, HI; [6]Department of Surgery, University of Rochester Medical Center, Rochester, NY; [7]Wilmot Cancer Institute, University of Rochester Medical Center, Rochester, NY

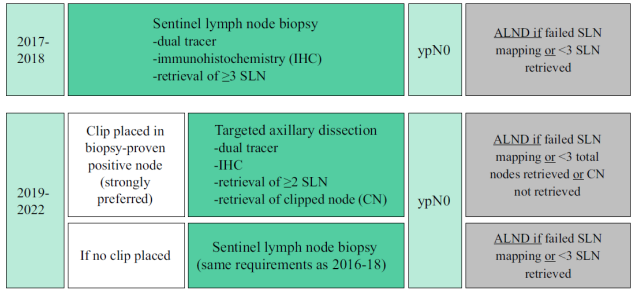



**FIG. 1** Dana-Farber Cancer Institute standardized operating procedure (SOP) for axillary staging surgery in cN1→ycN0 breast cancer patients after NAC (2017-2022) *Abbreviations*: NAC, neoadjuvant chemotherapy; ALND, axillary lymph node dissection; SLN, sentinel lymph node

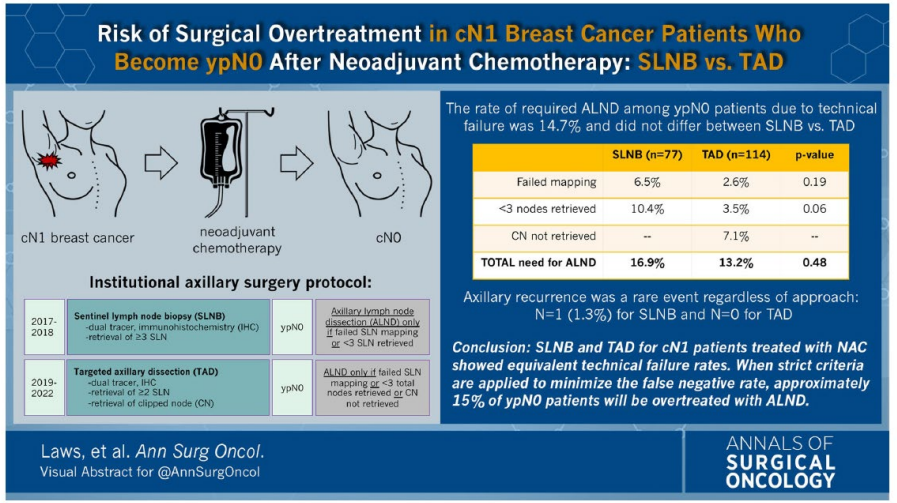



**TABLE 2** Technical failures of SLNB versus TAD in cN1 ypN0 breast cancer patients at Dana-Farber Cancer Institute (2017–2022)

| | Planned SLNB (n = 77) | Planned TAD(n = 114) | *p* |
|---|---|---|---|
| Failed mapping | 5 (6.5%) | 3 (2.6%) | 0.19 |
| <3 nodes retrieved | 8 (10.4%) | 4 (3.5%) | 0.06 |
| CN not retrieved | -- | 8 (7.1%) | -- |
| Total rate of required ALND | 13 (16.9%) | 15 (13.2%) | 0.48 |

*SLNB* sentinel lymph node biopsy; *TAD* targeted axillary dissection; *CN* clipped node; *ALND* axillary lymph node dissection

Los resultados con BSGC son similares a los obtenidos con la disección ganglionar dirigida

JAMA Oncol. 2023;9(11):1557-1564. doi:10.1001/jamaoncol.2023.3759

Research

JAMA Oncology | Original Investigation

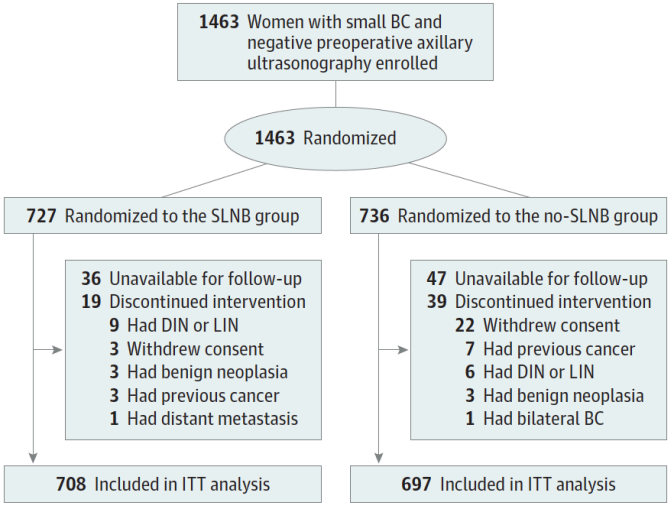
# Sentinel Lymph Node Biopsy vs No Axillary Surgery in Patients With Small Breast Cancer and Negative Results on Ultrasonography of Axillary Lymph Nodes

## The SOUND Randomized Clinical Trial

Oreste Davide Gentilini, MD; Edoardo Botteri, PhD; Claudia Sangalli, BSc; Viviana Galimberti, MD; Mauro Porpiglia, MD; Roberto Agresti, MD; Alberto Luini, MD; Giuseppe Viale, MD; Enrico Cassano, MD; Nickolas Peradze, MD; Antonio Toesca, MD; Giulia Massari, MD; Virgilio Sacchini, MD; Elisabetta Munzone, MD; Maria Cristina Leonardi, MD; Francesca Cattadori, MD; Rosa Di Micco, PhD; Emanuela Esposito, PhD; Adele Sgarella, MD; Silvia Cattaneo, MD; Massimo Busani, MD; Massimo Dessena, MD; Anna Bianchi, MD; Elisabetta Cretella, MD; Francisco Ripoll Orts, MD; Michael Mueller, MD; Corrado Tinterri, MD; Badir Jorge Chahuan Manzur, MD; Chiara Benedetto, PhD; Paolo Veronesi, MD; for the SOUND Trial Group

- **La omisión de la BSGC, tras una ecografía axilar negativa, no influye en el resultado locoregional**
- **Se irradió el 98%**

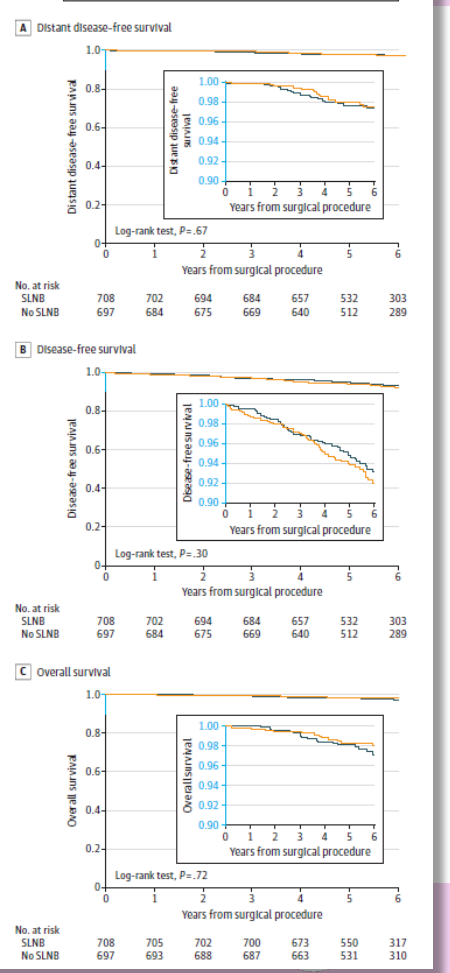
## Figure 1. Flow Diagram




## Table 2. Final Surgical Treatment and Recommended Adjuvant Therapy

| Treatment | Patients, No. (%) SLNB (n = 708) | No axillary surgery (n = 697) | *P* value |
|---|---|---|---|
| Surgery | | | |
| Breast-conserving | 12 (1.7) | 675 (96.8) | NA |
| Breast-conserving and SLNB | 646 (91.2) | 13 (1.9) | |
| Breast-conserving, SLNB, and AD | 45 (6.4) | 5 (0.7) | |
| Mastectomy and SLNB | 5 (0.7) | 4 (0.6) | |
| Hormone therapy | | | |
| No | 66 (9.3) | 49 (7.0) | .12 |
| Yes | 642 (90.7) | 648 (93.0) | |
| Hormone therapy in ER-positive cases[a] | | | |
| No | 14 (2.1) | 7 (1.1) | .12 |
| Yes | 638 (97.9) | 646 (98.9) | |
| Chemotherapy | | | |
| No | 566 (79.9) | 575 (82.5) | .22 |
| Yes | 142 (20.1) | 122 (17.5) | |
| Hormone therapy and chemotherapy | | | |
| Neither hormone therapy nor chemotherapy | 17 (2.4) | 11 (1.6) | .35 |
| Hormone therapy without chemotherapy | 549 (77.5) | 564 (80.9) | |
| Chemotherapy without hormone therapy | 49 (6.9) | 38 (5.5) | |
| Both hormone therapy and chemotherapy | 93 (13.1) | 84 (12.1) | |
| Radiotherapy | | | |
| No | 14 (2.0) | 17 (2.4) | .56 |
| Yes | 694 (98.0) | 680 (97.6) | |
| Trastuzumab | | | |
| No | 661 (93.4) | 651 (93.4) | .98 |
| Yes | 47 (6.6) | 46 (6.6) | |
| Trastuzumab in overexpressed *ERBB2*-positive cases[b] | | | |
| No | 3 (6.2) | 1 (2.1) | .62 |
| Yes | 45 (93.8) | 46 (97.9) | |

## Figure 2. Kaplan-Meier Estimates of Distant Disease–Free Survival, Disease-Free Survival, and Overall Survival



PS6-05 | San Antonio Breast Cancer Symposium – December 12, 2024 | Poster Spotlight Session 6: Locoregional Therapy

KBCSG

# First report of clinicopathologic characteristics and surgical outcomes of patients in the Avoid axillary Sentinel Lymph node biopsy After Neoadjuvant chemotherapy (ASLAN) trial (KBCSG-28)

Han-Byoel Lee, MD, PhD[1,2,4*], Jai Min Ryu, MD, PhD[4,*], Ji-Jung Jung, MD[3], Wonshik Han, MD, PhD[1,2,3], Sung Gwe Ahn, MD, PhD[5,6], Hee Jeong Kim, MD, PhD[7], Hyung Seok Park, MD, PhD[8], Ji Soo Choi, MD, PhD[9,10], Haeyoung Kim, MD, PhD[11], Won Kyung Cho, MD, PhD[11], Jeong Eon Lee, MD, PhD[4], for the ASLAN Investigators

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SAN ANTONIO BREAST CANCER SYMPOSIUM · UT Health · AACR

## BACKGROUND

- With advances in neoadjuvant systemic therapy (NST), response to treatment and pathologic complete response (pCR) rates have increased considerably, producing de-escalation of surgery strategies. There are three on-going trials for omission of SLNBx in breast pCR after NST[1].

**Table 1.** On-going trials for omission of SLNBx in breast pCR after NST

| | Design | Subject | Subtype | T endpoint | Country | Status |
|---|---|---|---|---|---|---|
| ASLAN | Single-arm | cT1-3,N0-1 | HER-2, TNBC, Low-ER+ | 5-yr RFS (84.0%) | Korea | Accrual complete |
| EUBREAST-01 | Single-arm | cT1-3,N0 | HER-2, TNBC | 3-yr axillary recurrence (≤98.5%) | Europe | Recruiting (expected completion in Dec 2024) |
| ASICS | Single-arm | cN0 | HER-2, TNBC | 5-yr axillary recurrence (≤6%) | Netherlands | Recruiting |

- The ASLAN trial (NCT04993625) is a prospective, multicenter, single-arm non-inferiority trial with a target accrual of 178 patients that aims to demonstrate the oncologic safety of omitting axillary surgery in patients with a pathologic complete response in the breast after NST (Figure 1).

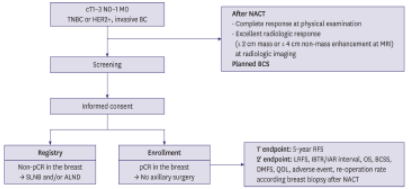


**Figure 1.** Scheme of the ASLAN trial [2]

## PURPOSE

- We aimed to investigate the clinicopathologic characteristics and surgical outcomes of the patients in the ASLAN trial.

## METHODS and MATERIALS

- The ASLAN trial screened 254 patients who met the inclusion criteria from September 2021 to December 2023.
- A total of 245 patients who received BCS were included for analysis. Clinicopathologic variables, including the pCR status of the breast and axillary lymph nodes (LNs), were analyzed.
- Detailed protocol of the ASLAN trial was described previously[2].

## RESULTS

- Most patients had cT2 (217/245, 88.6%) and cN0 (189/245, 77.1%) disease before NST.
- 130 (53.1%) were TNBC, 113 (46.1%) were HER2-positive, and 2 (0.8%) were low-ER.
- Among 56 (22.9%) cN1 patients, a fine-needle aspiration biopsy was performed on the suspicious LNs in 37 (66.1%) and 24 (42.9%) had LN metastasis.
- After BCS, a breast pCR was confirmed in 184 (75.1%) and SLNB avoided in 182 (74.3%) patients, two of whom were dropped from enrollment due to refusal of radiation therapy or lost to follow-up, resulting in 180 patients with on-going follow-up.
- Among 61 (23.0%) patients with a breast non-pCR, SLNB only was performed in 58, SLNB followed by ALND in one, and no axillary surgery in two (patient refusal). 94.9% (56/59) of patients who received axillary surgery had no LN metastasis, and two had micrometastasis in one LN.
- Patients with a non-pCR had more ER-positive disease (p=0.002), lower Ki67 (p=0.025), larger post-NST size on ultrasound (p=0.006), and no difference in the proportion of cN1 patients (p=0.824).

## RESULTS

**Table 2.** Baseline characteristics (N=245)

| | Total (N=245) | pCR (N=184) | non-pCR (N=61) | p-value |
|---|---|---|---|---|
| Age, median (range) | 51.0 (44-57) | 49.0 (44-56) | 54.0 (46-58) | 0.042 |
| pre-NST size(mm), median (range) | 27.0 (22.0-34.0) | 27.0 (22.0-34.0) | 26.0 (22.0-33.0) | 0.859 |
| Clinical T stage | | | | 0.806 |
| T1c | 13 (5.3%) | 9 ( 4.9%) | 4 ( 6.6%) | |
| T2 | 217 (88.6%) | 163 (88.6%) | 54 (88.5%) | |
| T3 | 15 (6.1%) | 12 ( 6.5%) | 3 ( 4.9%) | |
| Clinical N stage | | | | 0.875 |
| N0 | 189 (77.1%) | 142 (77.2%) | 47 (77.0%) | |
| N1 | 56 (22.9%) | 42 (22.8%) | 14 (23.0%) | |
| Subtype | | | | 0.001 |
| HR-/HER2- | 130 (53.1%) | 99 (53.8%) | 31 (50.8%) | |
| HR-/HER2+ | 53 (21.6%) | 48 (26.1%) | 5 ( 8.2%) | |
| HR+/HER2+ | 60 (24.5%) | 35 (19.0%) | 25 (41.0%) | |
| HR+/HER2- | 2 (0.8%) | 2 ( 1.1%) | 0 ( 0.0%) | |

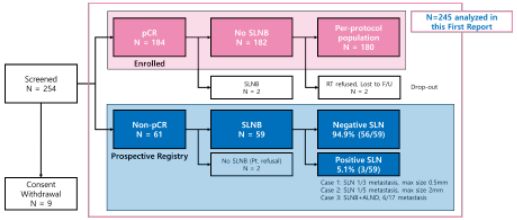


**Figure 2.** CONSORT diagram

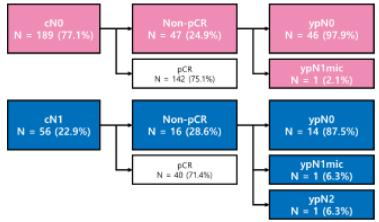


**Figure 3.** Lymph node status according to clinical nodal staging

## CONCLUSIONS

- The ASLAN trial completed screening of 245 patients by performing BCS of the breast and enrolled 182 patients who were confirmed to have a pCR on BCS and were omitted axillary surgery. Axillary surgery on cN0-1 patients with excellent radiologic response to NST had LN metastasis in less than 5%. This trial will be the first prospective trial to determine the oncologic safety of avoiding axillary surgery in exceptional responders to NST. Data lock is expected in December 2028.

## ACKNOWLEDGEMENT

- This study was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government's Ministry of Education (NRF 2021R1A2C1094010, Seoul, and was funded by the Korean Breast Cancer Society & Korean Breast Cancer Study . (KBCSG-28).

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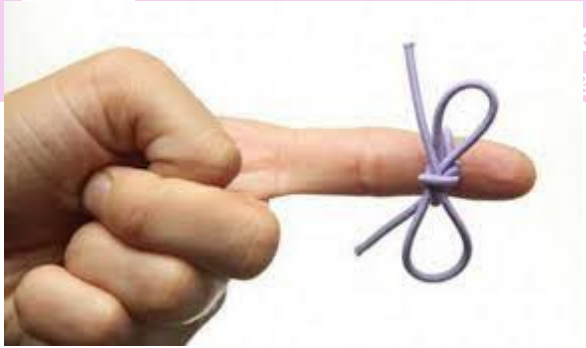

- **Puede omitirse la irradiación de supraclavicular y nivel III axilar en las pacientes que experimentan una remisión completa tras TSP**

- **Puede/podrá sustituirse la linfadenectomía por irradiación ganglionar en pacientes con ypN+ con baja carga**

# MasterClass Radioterapia cáncer de mama 2025

## 2ª Sesión: Radioterapia áreas ganglionares – Tras quimioterapia neoadyuvante