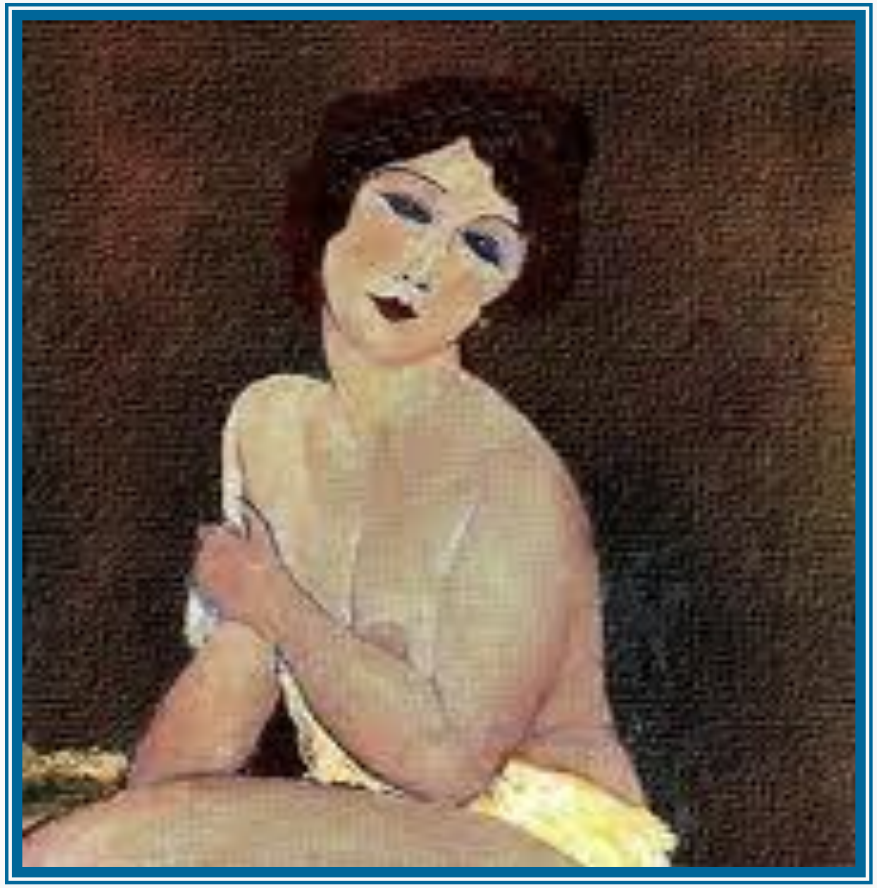


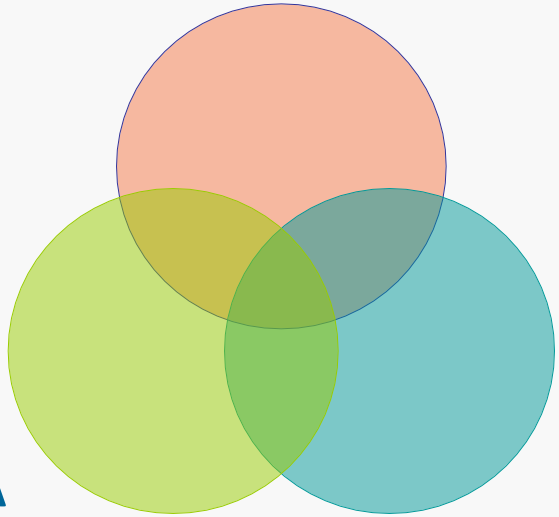
ACTUALIZACION EN TECNICAS DE RADIOTERAPIA EXTERNA, BRAQUITERAPIA, Y RADIOTERAPIA INTRAOPERATORIA

INDICACIONES

Dra. Belén de Paula

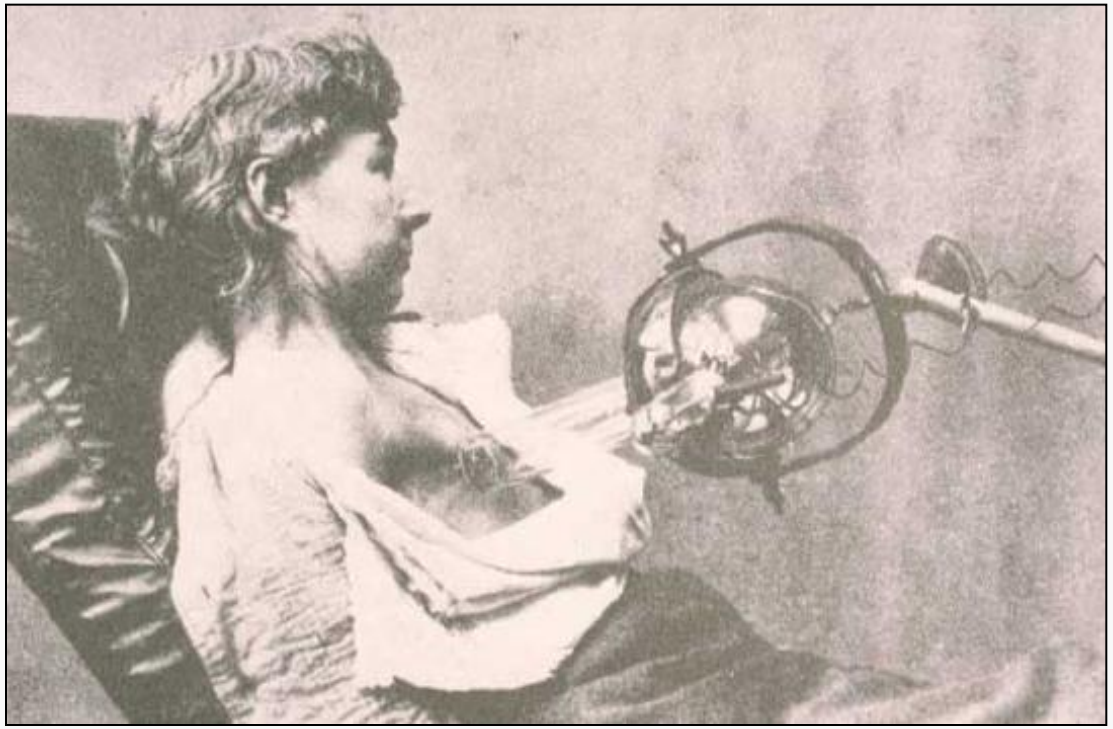
Sº de Oncología Radioterápica / Onkologikoa

CIRUGIA



RADIOTERAPIA

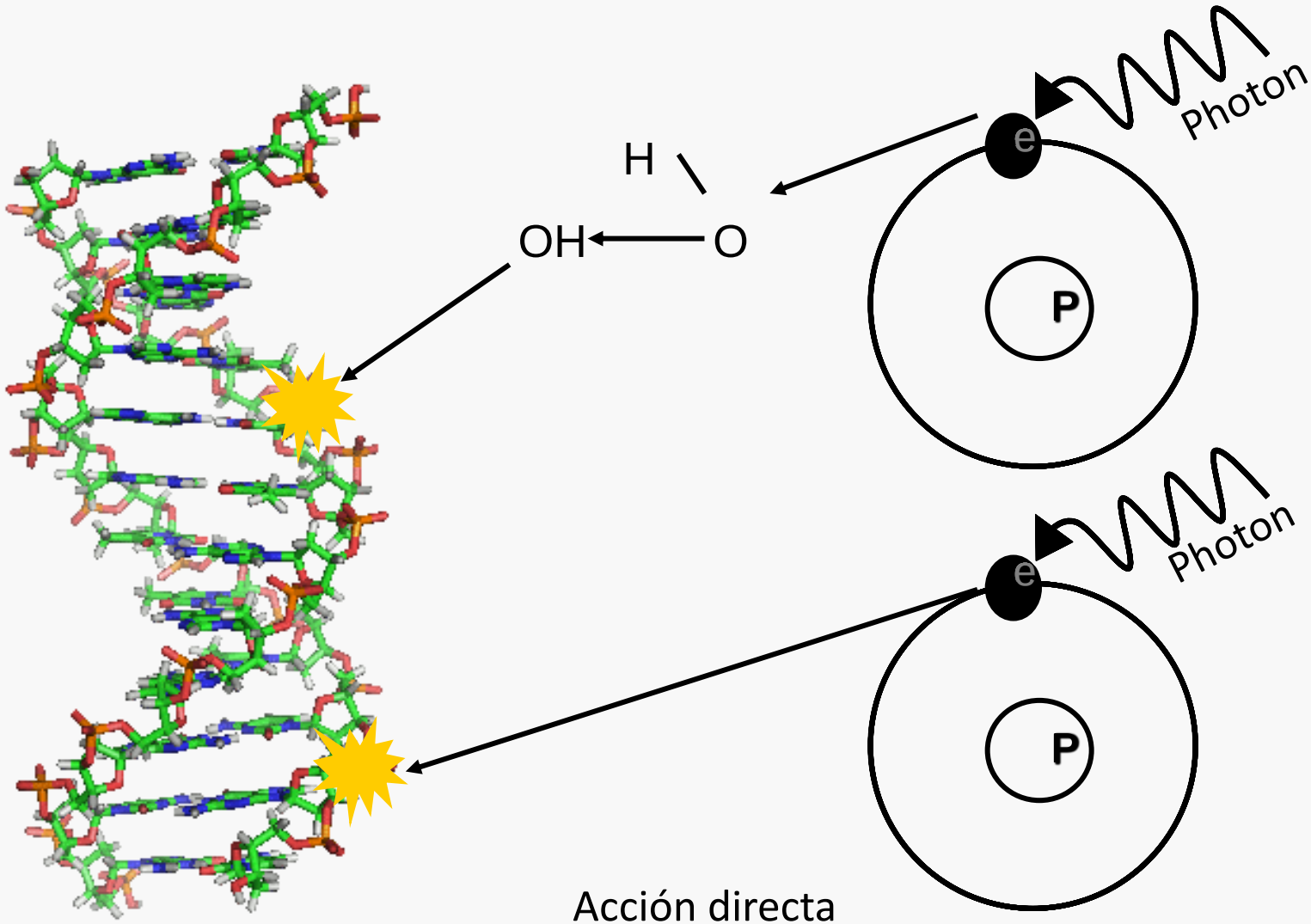
TRATAMIENTO SISTEMICO



1896 tratamiento con Rayos X de un ca. de mama ulcerado. H.Grubbé. Chicago

- 1895 Roentgen
- 1896 Becquerel
- **1898 Esposos Curie**
  Radium, Polonio
- 1934 Irene Curie

Acción indirecta



Acción directa

2 escenarios

Radioterapia post mastectomía

- RADIOTERAPIA EXTERNA

Radiación generada por una fuente externa al paciente

(Aceleradores lineales)

Fotones / Electrones

Novedades técnicas

Tratamiento conservador

- RADIOTERAPIA EXTERNA
- BRAQUITERAPIA o CURIETERAPIA

Fuente colocada en el paciente

(Iridio 192)

- RADIOTERAPIA INTRAOPERATORIA

Pequeños aceleradores con aplicadores en contacto con el paciente

Novedades técnicas
Cambios en protocolos

Técnicas en Radioterapia externa

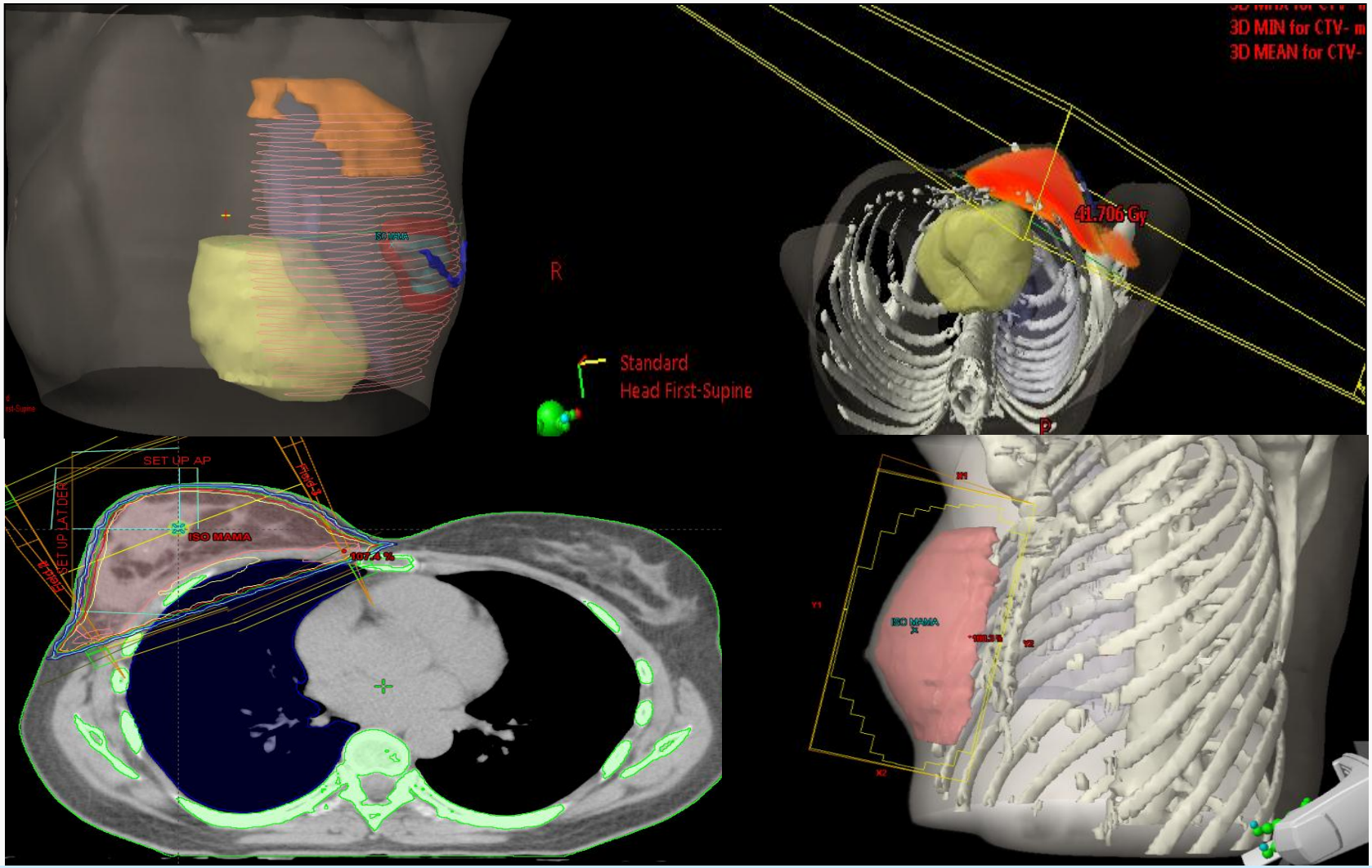
- Radioterapia conformacional 3D (3D-CRTE): estándar

- Radioterapia con Intensidad modulada (IMRT)

- Tomoterapia

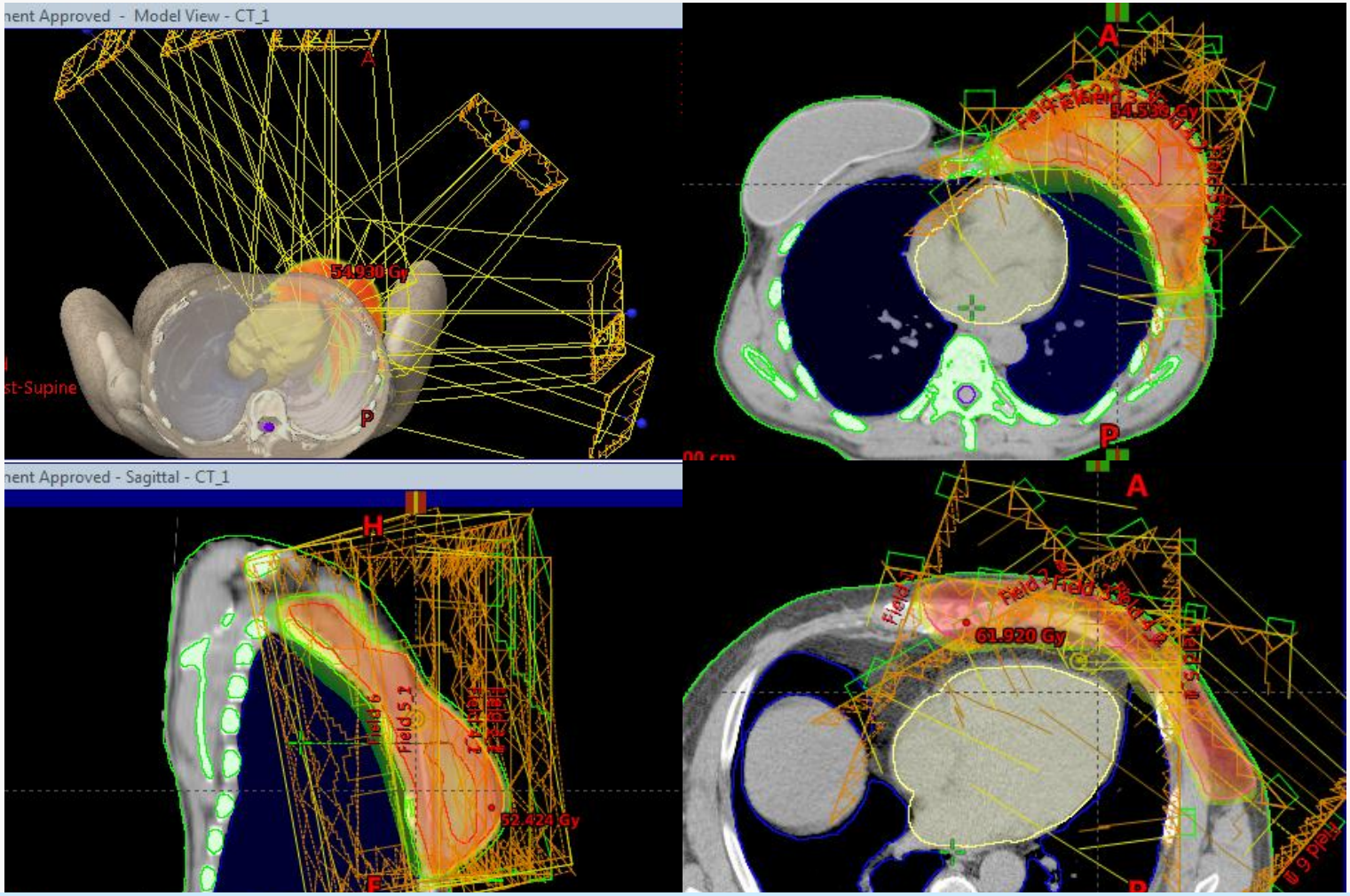
RTE conformacional 3D

- Fotones, acelerador lineal
- Dosimetría en 3D con TAC.

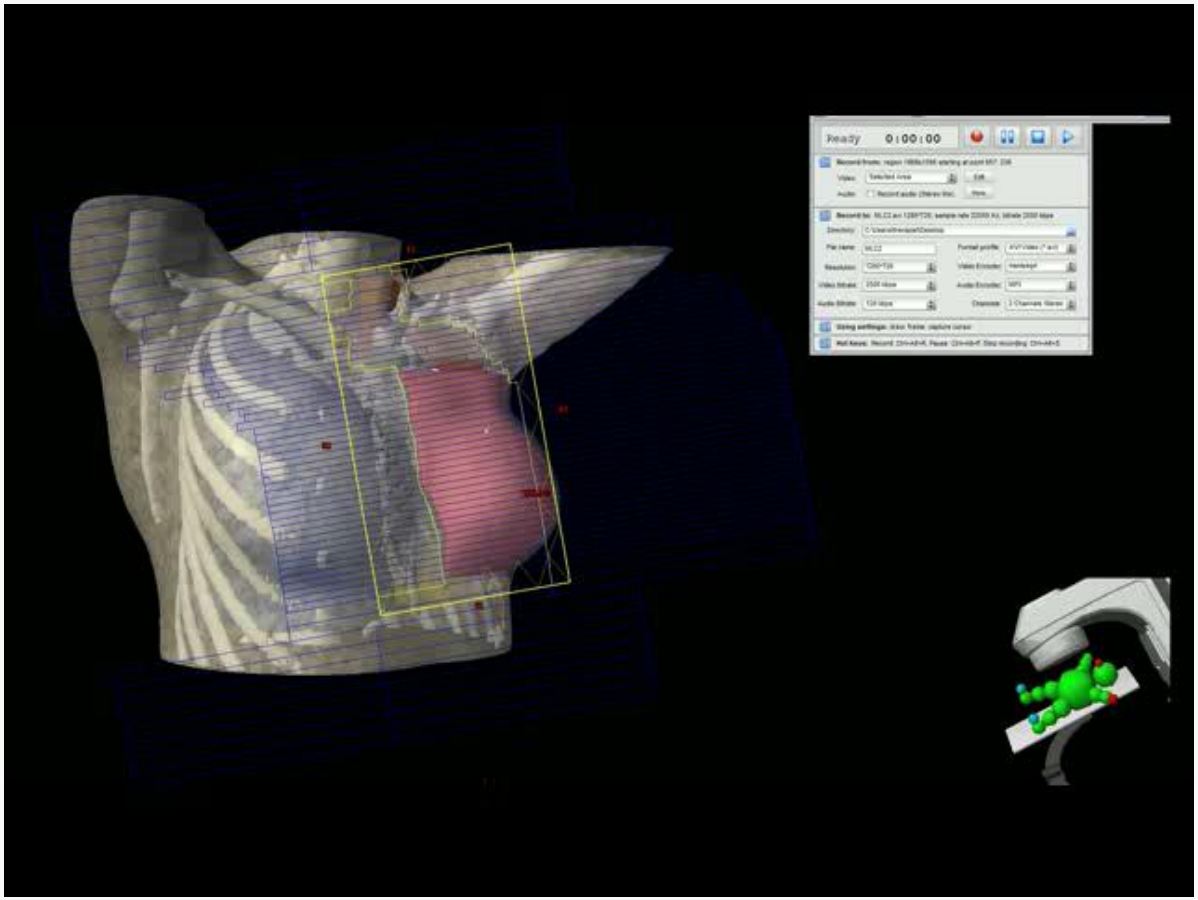


RT con Intensidad modulada (IMRT)

- La radiación se administra con intensidad de dosis no uniforme en el volumen blanco.
- Nos permite mayor conformación de las curvas de dosis.
- La ventaja fundamental es la reducción del volumen de tejido sano expuesto a dosis altas de irradiación.



RT con Intensidad modulada (IMRT)

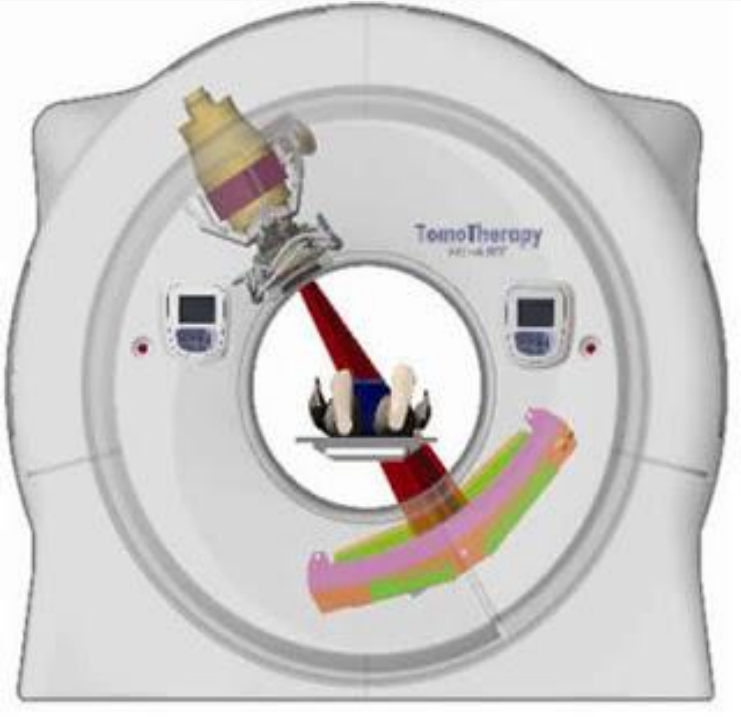


Indicación IMRT:

- EL volumen a irradiar presenta una forma irregular con volúmenes a diferentes profundidades
- No conseguimos con técnicas de RTC-3D proteger de forma debida las estructuras críticas. En el caso de la mama corazón, pulmón, plexo braquial, medula

Tomoterapia Helicoidal

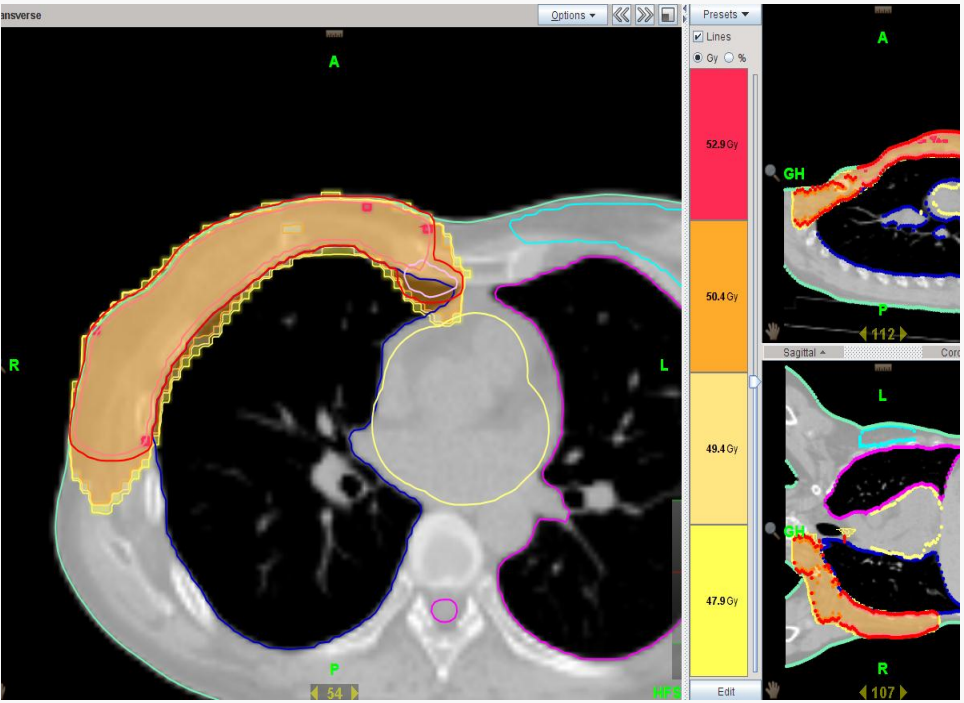
- Sistema que integra un acelerador que produce un haz de radiación que gira continuamente, y un TAC que permite la obtención de imágenes de megavoltage para la realización de radioterapia guiada por imágenes (IGRT).
- El giro del haz mientras la mesa avanza produce una entrega helicoidal de la radiación
- Múltiples entradas de campo, premite una modulación de la intensidad muy elevada, siendo el referente (gold Standard) en conformación para IMRT.

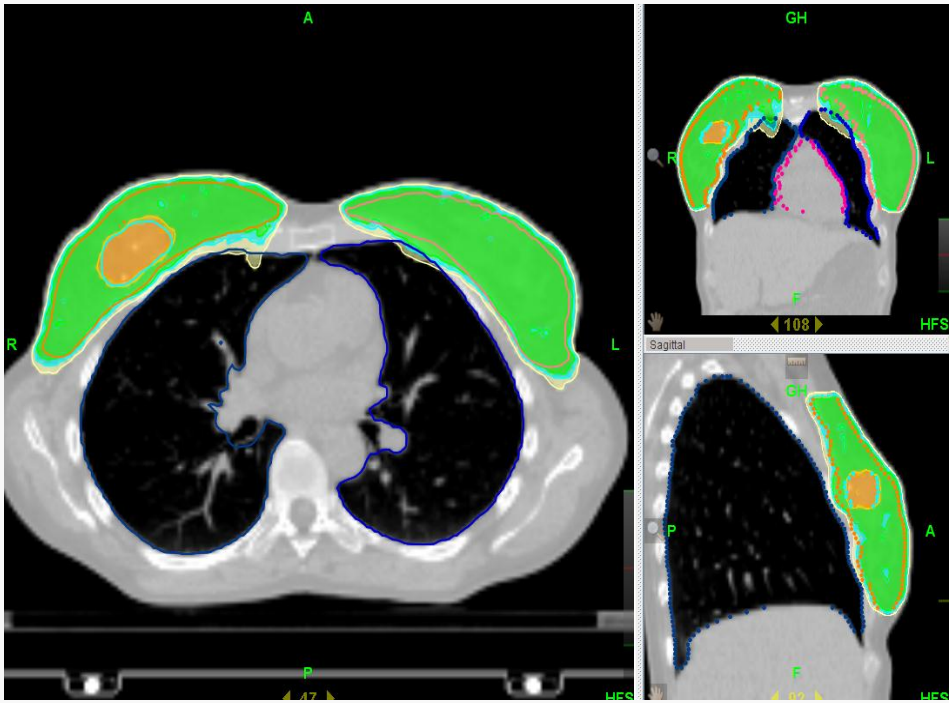


Tomoterapia

Indicación :

- Campos muy extensos. Bilateralidad
- Irradiación de la cadena mamaria interna,
- Reirradiaciones





Toxicidad

Aguda :

- Radiodermitis
- Molestias locales, dolorimiento, sensación de tensión
- Astenia

Curan en un plazo variable entre 3-6 semanas

Tardía:

- Fibrosis
- Linfedema (sobre todo si hay irradiacion tras vaciamiento axilar

El mayor éxito del avance en las técnicas de Radioterapia es la disminución de la toxicidad

Son secuelas crónicas

Radioterapia en el tratamiento conservador

- Ultimas 3 décadas: Estándar en tratamiento conservador de mama precoz ha sido la cirugía conservadora seguida de RT al volumen mamario restante 45-50Gy +/- boost (**5-6 semanas**) +/- sistémico.

  Boost (aumento de dosis en el lecho tumoral:
  - RT externa
  - Braquiterapia
  - RT intraoperatoria

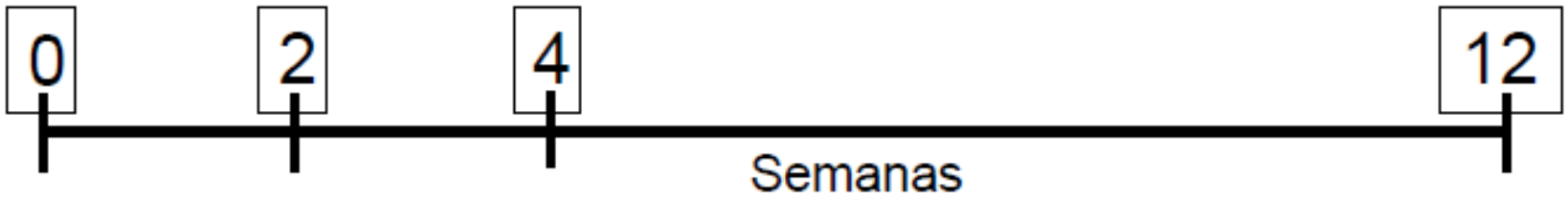
- Tratamiento bien establecido con un alto nivel de evidencia.

- **Tendencia en la última década: búsqueda del mínimo tratamiento eficaz.**

- Es necesario irradiar toda la mama?

- Podemos acortar los tratamientos?

Novedades técnicas
Cambios en protocolos



Cirugía ..... Radioterapia Externa Clásica

Cirugía · Hipofraccionamiento — Cirugía + Hipofraccionamiento

Cirugía · BT — Cirugía + Irradiación parcial, BT o RTE

Cirugía — Cirugía + Radioterapia Intraoperatoria

Concepto de Irradiación parcial acelerada de la mama

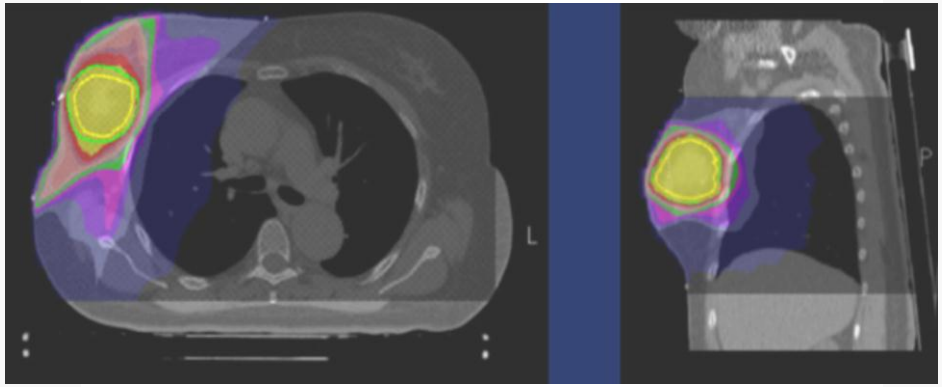
- Conjunto heterogéneo de técnicas diferentes que irradian en pocas sesiones un volumen limitado de la mama.

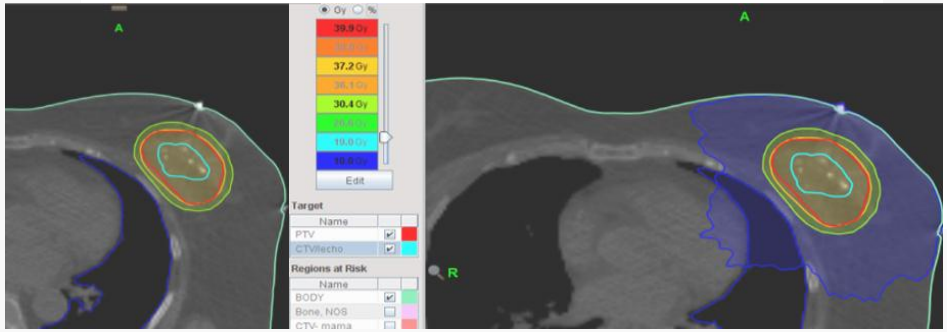
- Se administran dosis biológicamente equivalentes a la dosis estándar en 5 días, consecutivos,

  1 sola sesión en las técnicas intraoperatorias.

Irradiación parcial acelerada de la mama

- **Técnicas de RT externa**
  - 3D-CRTE
  - IMRT
  - Tomoterapia





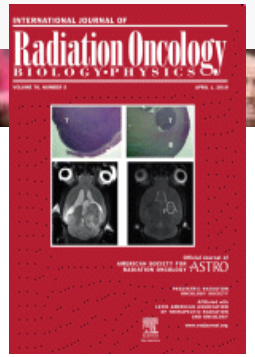
- **Técnicas de Braquiterapia**
  - Braquiterapia intersticial multicatéter
  - Braquiterapia intracavitaria: MammoSite

- **Técnicas de RIO (Intraoperatoria)**
  - Mevatron (acelerador de electrones)
  - Intrabeam (fuente de kilovoltaje)

Irradiación parcial de mama - Estudios randomizados

Estudio	Diseño	N	Brazo control	Brazo experimental
NIO Budapest, Hungary	No inferioridad	258	50 GyWB	(1) Interstitial BT (5.2 Gy X 7) (2) Electrons (50 Gy)
NSABP B-39/RTOG	Equivalencia	4300	WBI 50-50.4 Gy 1.8-2 Gy/fracc Boost opcional hasta 60-66 Gy	34Gy, 3.4Gy/fracc BT multicatéter o MammoSite 38.5Gy/3.85/fracc 3D CRT
RAPID/Ontario	Equivalencia	2128	WBI 42.5 Gy/16 fracc 50 Gy/25 fracc Boost opcional 10 Gy	38.5Gy 10 fracc 3D CRT
GEC-ESTRO	No inferioridad	1170	WBI 50-50.4 Gy 1.8-2 Gy/fracc Boost opcional hasta 60Gy	BT HDR intersticial 32Gy/8 fracc, BT HDR intersticial 30.3Gy/7 fracc 50 Gy PDR
IMPORT-LOW, UK	No inferioridad	1935	WBI 40 Gy/15 fracc /3 semanas	IMRT 36Gy áreas bajo riesgo/15 f y 40 Gy/ 15 f área del T primario 40 Gy/15 f área del T primario
ELIOT, Milán	Equivalencia	824	WBI 50-50.4 Gy 1.8-2 Gy/fracc Boost opcional 10 Gy	RIO 21 Gy / 1 fracc Electrones
TARGIT	Equivalencia	1600	WBI según protocolos de cada Institución	RIO 20 Gy / 1 fracc X-rays 50 KV
TROG	Equivalencia	2094	WBI 50 Gy/25 fx 45 Gy / 15 fx +HT 42.5Gy/ 16	RTC 3D 3 er brazo BT multicatéter + HT HT MammoSite IORT

Irradiación parcial de mama – Criterios de selección



ASTRO

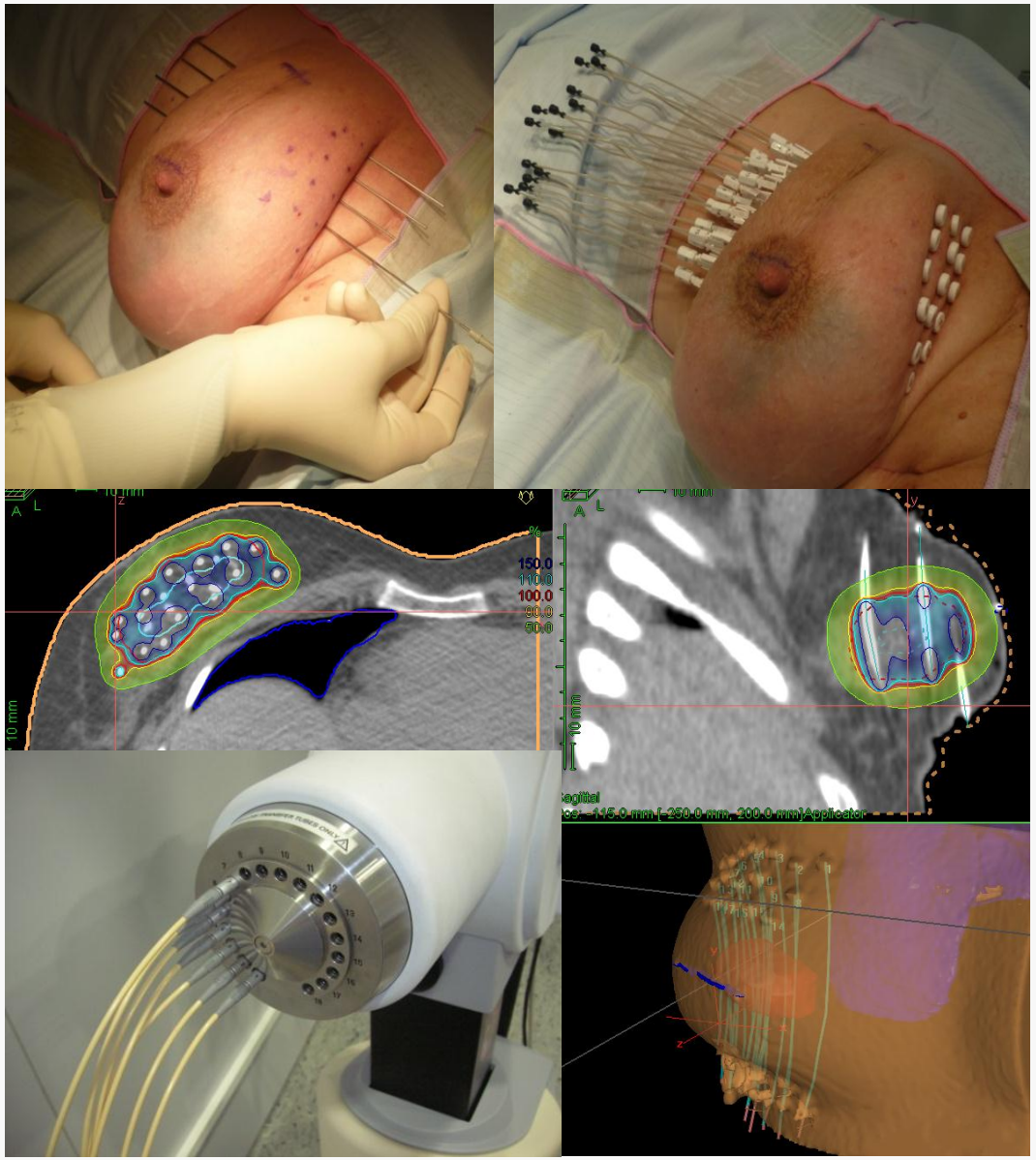
- Edad ≥ 60
- No BRCA1/2
- Tumores ≤ 2 cm
- Ductales infiltrantes
- Cualquier G
- Márgenes negativos (2 mm)
- RH +
- No afectación VL
- No en puro CDIS
- No CID extenso
- CLIS se permite
- Multifocalidad si no excede 2 cm
- No multicentricidad
- pN0-N0i+ (GC o Vac axilar)
- No QTNA

ESTRO

- **Edad > 50**
- **T1-2 < 3 cm**
- CDI
- Cualquier G
- Márgenes negativos (2 mm)
- **RH +/-**
- No afectación VL
- No CDIS
- No CID extenso
- No en CLI
- **Unifocal**
- Unicéntrico
- pN0 (GC o Vac axilar)
- No QTNA

Braquiterapia intersticial multicatéter

- Es la técnica con un seguimiento mas largo.
- **Técnica invasiva,** precisa una segunda anestesia / sedación para implantar los catéteres
- Se puede realizar de forma ambulatoria
- El tratamiento se recibe en 5 días.
- La dosis que reciben los tejidos sanos de la mama y los órganos de riesgo son menores que con técnicas de RTE
- Se puede evitar la 2ª intervención?



Braquiterapia intersticial multicatéter

Groupe Européen de Curietherapie
European Society for Therapeutic Radiology and Oncology

GEC-ESTRO APBI TRIAL

Articles

5-year results of accelerated partial breast irradiation using sole interstitial multicatheter brachytherapy versus whole-breast irradiation with boost after breast-conserving surgery for low-risk invasive and in-situ carcinoma of the female breast: a randomised, phase 3, non-inferiority trial

Vratislav Strnad, Oliver J Ott, Guido Hildebrandt, Daniela Kauer-Dorner, Hellen Knauerhase, Tibor Major, Jaroslaw Lyczek, Jose Luis Guinot, Jürgen Dunst, Cristina Gutierrez Miguelez, Pawel Slampa, Michael Allgäuer, Kristina Lössl, Bülent Polat, György Kovács, Arnt-René Fischedick, Thomas G Wendt, Rainer Fietkau, Marion Hindemith, Alexandra Resch, Anna Kulik, Leo Arribas, Peter Niehoff, Fernando Guedea, Annika Schlamann, Richard Pötter, Christine Gall, Martina Malzer, Wolfgang Uter, Csaba Polgár, on behalf of the Groupe Européen de Curiethérapie of European Society for Radiotherapy and Oncology (GEC-ESTRO)

Summary

Background In a phase 3, randomised, non-inferiority trial, accelerated partial breast irradiation (APBI) for patients with stage 0, I, and IIA breast cancer who underwent breast-conserving treatment was compared with whole-breast irradiation. Here, we present 5-year follow-up results.

Methods We did a phase 3, randomised, non-inferiority trial at 16 hospitals and medical centres in seven European countries. 1184 patients with low-risk invasive and ductal carcinoma in situ treated with breast-conserving surgery were centrally randomised to either whole-breast irradiation or APBI using multicatheter brachytherapy. The primary endpoint was local recurrence. Analysis was done according to treatment received. This trial is registered with ClinicalTrials.gov, number NCT00402519.

Findings Between April 20, 2004, and July 30, 2009, 551 patients had whole-breast irradiation with tumour-bed boost and 633 patients received APBI using interstitial multicatheter brachytherapy. At 5-year follow-up, nine patients treated with APBI and five patients receiving whole-breast irradiation had a local recurrence; the cumulative incidence of local recurrence was 1·44% (95% CI 0·51–2·38) with APBI and 0·92% (0·12–1·73) with whole-breast irradiation (difference 0·52%, 95% CI −0·72 to 1·75; p=0·42). No grade 4 late side-effects were reported. The 5-year risk of grade 2–3 late side-effects to the skin was 3·2% with APBI versus 5·7% with whole-breast irradiation (p=0·08), and 5-year risk of grade 2–3 subcutaneous tissue late side-effects was 7·6% versus 6·3% (p=0·53). The risk of severe (grade 3) fibrosis at 5 years was 0·2% with whole-breast irradiation and 0% with APBI (p=0·46).

Interpretation The difference between treatments was below the relevance margin of 3 percentage points. Therefore, adjuvant APBI using multicatheter brachytherapy after breast-conserving surgery in patients with early breast cancer is not inferior to adjuvant whole-breast irradiation with respect to 5-year local control, disease-free survival, and overall survival.

Funding German Cancer Aid.

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See Online/Comment http://dx.doi.org/10.1016/S0140-6736(15)00518-8

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Introduction

Breast cancer is the most common cancer diagnosed in women in Europe. Previous uncertainties about the role of adjuvant radiation therapy after breast-conserving surgery have been clarified after publication of randomised trials showing the benefits of radiation therapy added to breast-conserving surgery, and adjuvant radiation therapy became widely accepted as standard for the treatment of early-stage breast cancer over the past three decades.[1] The standard technique of radiation therapy after breast-conserving surgery is to treat the entire breast up to a total dose of 40–50 Gy, with or without a tumour-bed boost.[2] Despite the evident equivalence of breast-conserving therapy with adjuvant whole-breast irradiation compared with mastectomy alone, up to 50% of patients in the USA who are clinically qualified for breast conservation still undergo mastectomy with the goal to omit radiation therapy.[3] One of the most important reasons for underuse of breast-conserving treatment is the length of adjuvant radiation therapy.

Accelerated partial breast irradiation (APBI) is an attractive treatment strategy, not only to shorten the course of radiation therapy from 3–7 weeks to 2–5 days but also to very effectively reduce radiation exposure to the breasts, the skin, the lungs, and, in particular, the heart.[4] Over the past 15 years, different modalities of APBI have been introduced into clinical practice.[5–11] Several phase 2 trials[3] and one small single-institution

- Equivalencia
- Objetivo primario: control local
- Objetivos secundarios:
  - Toxicidad aguda y crónica,
  - Cosmesis,
  - OS, DFS,
  - calidad de vida

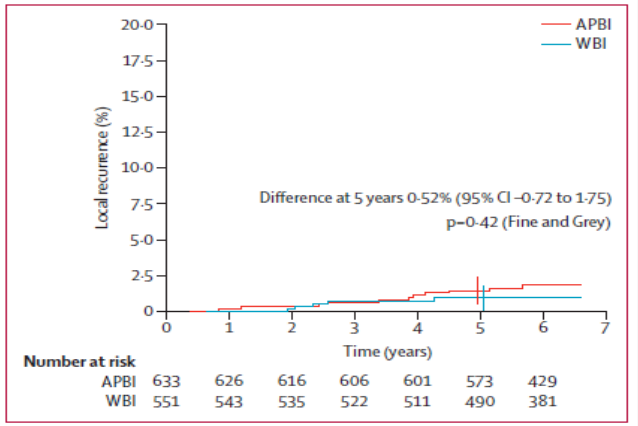


Figure 2: **Ipsilateral breast tumour recurrence**
APBI=accelerated partial breast irradiation. WBI=whole-breast irradiation.

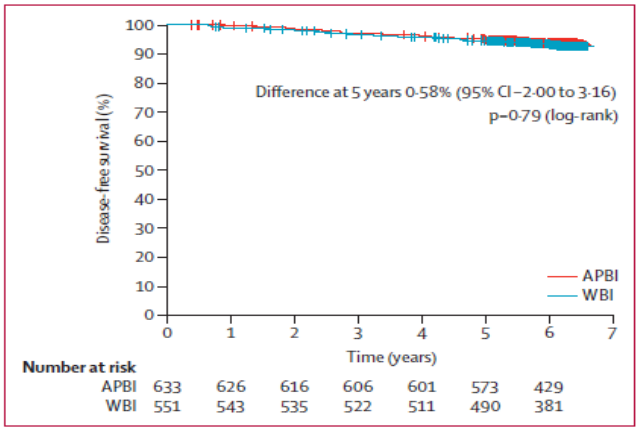
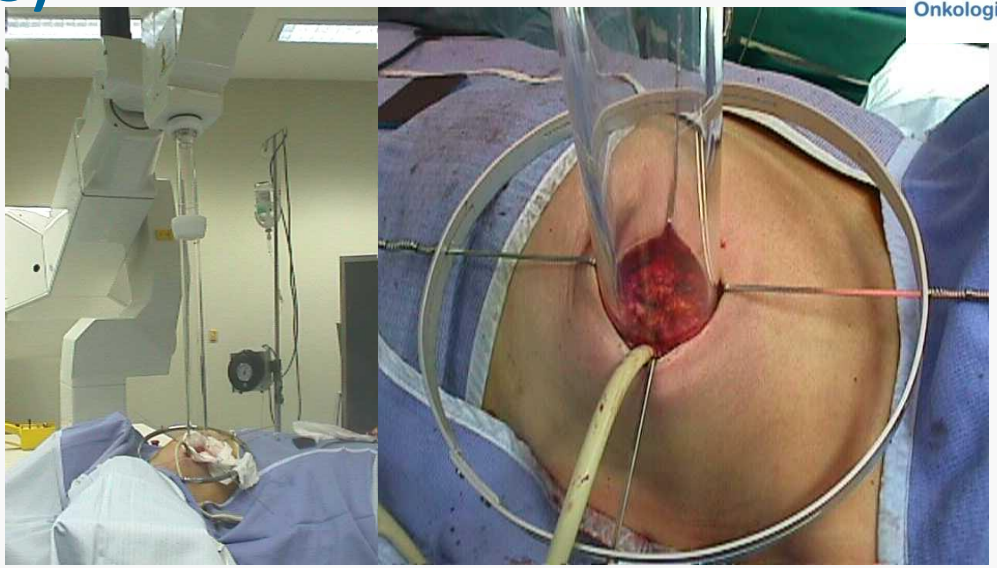


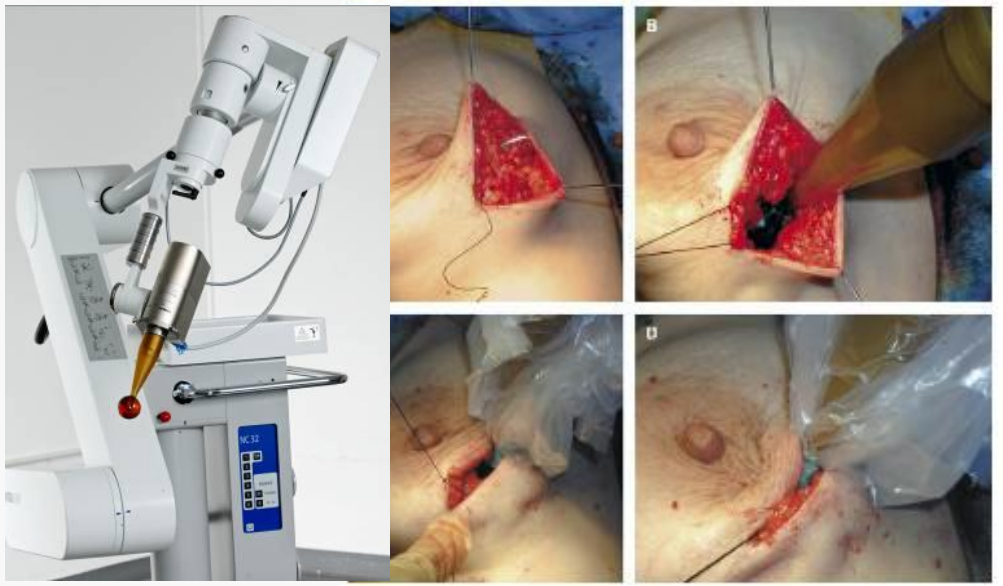
Figure 3: **Disease-free survival**
APBI=accelerated partial breast irradiation. WBI=whole-breast irradiation.

Radioterapia Intraoperatoria (RIO)

- Procedimiento durante el acto quirúrgico
- Después de extraer la lesión tumoral se aplica una única sesión de radioterapia.
- Para la paciente la ventaja es que la Radioterapia adyuvante estaría ya realizada
- Tiene una desventaja: **No disponemos de A. Patológica definitiva.**



ELIOT- electronbeam IORT



Intrabeam - low energy X-rays: 30-50 kV

ELIOT (IEO, Milán)

Onkologikoa

Intraoperative radiotherapy versus external radiotherapy for early breast cancer (ELIOT): a randomised controlled equivalence trial

Umberto Veronesi, Roberto Orecchia, Patrick Maisonneuve, Giuseppe Viale, Nicole Rotmensz, Claudia Sangalli, Alberto Luini, Paolo Veronesi, Viviana Galimberti, Stefano Zurrida, Maria Cristina Leonardi, Roberta Lazzari, Federica Cattani, Oreste Gentilini, Mattia Intra, Pietro Caldarella, Bettina Ballardini

Summary

Background Intraoperative radiotherapy with electrons allows the substitution of conventional postoperative whole breast irradiation with one session of radiotherapy with the same equivalent dose during surgery. However, its ability to control for recurrence of local disease required confirmation in a randomised controlled trial.

Methods This study was done at the European Institute of Oncology (Milan, Italy). Women aged 48–75 years with early breast cancer, a maximum tumour diameter of up to 2·5 cm, and suitable for breast-conserving surgery were randomly assigned in a 1:1 ratio (using a random permuted block design, stratified for clinical tumour size [<1·0 cm *vs* 1·0–1·4 cm *vs* ≥1·5 cm]) to receive either whole-breast external radiotherapy or intraoperative radiotherapy with electrons. Study coordinators, clinicians, and patients were aware of the assignment. Patients in the intraoperative radiotherapy group received one dose of 21 Gy to the tumour bed during surgery. Those in the external radiotherapy group received 50 Gy in 25 fractions of 2 Gy, followed by a boost of 10 Gy in five fractions. This was an equivalence trial; the prespecified equivalence margin was local recurrence of 7·5% in the intraoperative radiotherapy group. The primary endpoint was occurrence of ipsilateral breast tumour recurrences (IBTR); overall survival was a secondary outcome. The main analysis was by intention to treat. This trial is registered with ClinicalTrials.gov, number NCT01849133.

Findings 1305 patients were randomised (654 to external radiotherapy and 651 to intraoperative radiotherapy) between Nov 20, 2000, and Dec 27, 2007. After a median follow-up of 5·8 years (IQR 4·1–7·7), 35 patients in the intraoperative radiotherapy group and four patients in the external radiotherapy group had had an IBTR (p<0·0001). The 5-year event rate for IBRT was 4·4% (95% CI 2·7–6·1) in the intraoperative radiotherapy group and 0·4% (0·0–1·0) in the external radiotherapy group (hazard ratio 9·3 [95% CI 3·3–26·3]). During the same period, 34 women allocated to intraoperative radiotherapy and 31 to external radiotherapy died (p=0·59). 5-year overall survival was 96·8% (95% CI 95·3–98·3) in the intraoperative radiotherapy group and 96·9% (95·5–98·3) in the external radiotherapy group. In patients with data available (n=464 for intraoperative radiotherapy; n=412 for external radiotherapy) we noted significantly fewer skin side-effects in women in the intraoperative radiotherapy group than in those in the external radiotherapy group (p=0·0002).

Interpretation Although the rate of IBTR in the intraoperative radiotherapy group was within the prespecified equivalence margin, the rate was significantly greater than with external radiotherapy, and overall survival did not differ between groups. Improved selection of patients could reduce the rate of IBTR with intraoperative radiotherapy with electrons.

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See Online for a podcast interview with Umberto Veronesi

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Correspondence to: Prof Umberto Veronesi, European Institute of Oncology, 20141 Milan, Italy umberto.veronesi@ieo.it

Introduction

Until the 1970s, surgical management of breast cancer was based on the Halsted mastectomy, with minor modifications. From the 1970s, studies[1–3] showed that breast-conserving surgery plus radiotherapy resulted in much the same outcomes as the Halsted mastectomy for tumours up to 5 cm in size; however, when radiotherapy was omitted, women had an increased likelihood of local recurrence.[4,5] Thus, breast-conserving surgery followed by whole breast irradiation became the mainstay of surgical treatment for small breast carcinoma. In the past 10 years, new regimens have been developed: studies[6] have shown that the duration of whole breast irradiation can be abbreviated from 6 weeks to 3 weeks and partial breast irradiation has reduced the irradiation field to the quadrant in which the carcinoma arose.[7]

Despite these advances, most women are still required to attend postoperative radiotherapy for about 30 days consecutively. Many women living a substantial distance from a radiotherapy centre have serious difficulties attending every day, especially those living in small villages, mountainous regions, or islands. Intraoperative

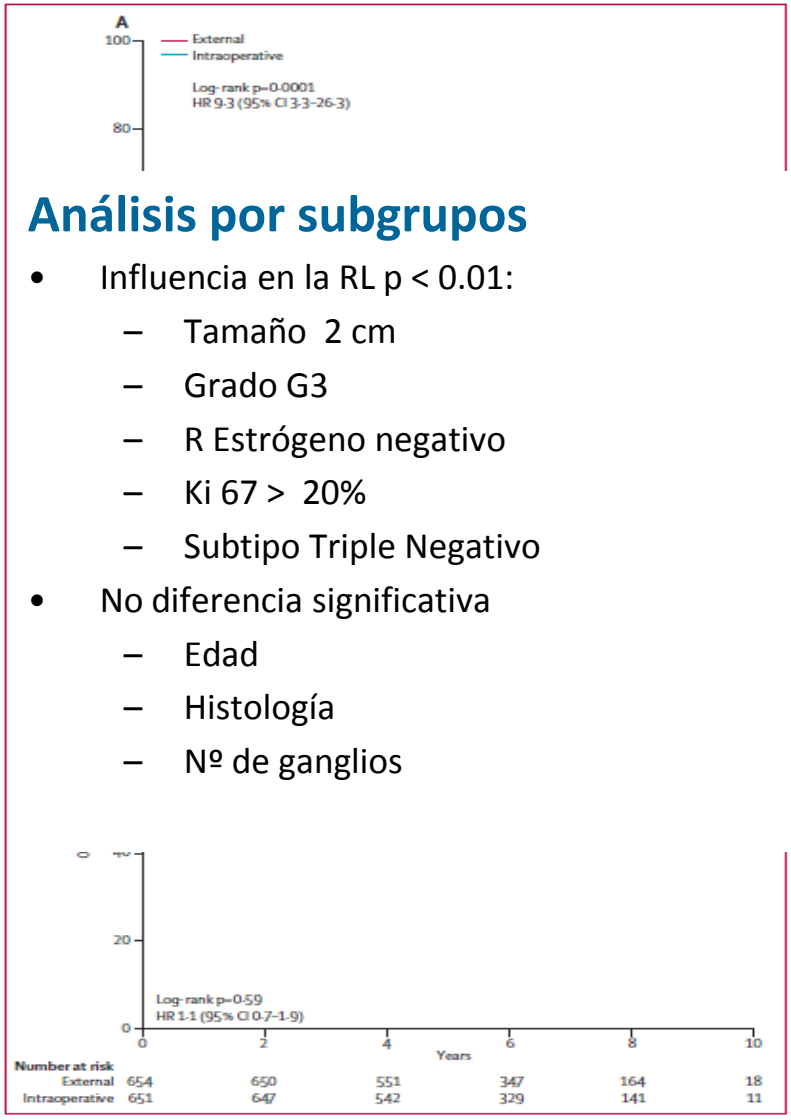


Figure 2: Cumulative incidence of (A) ipsilateral breast tumour recurrence and (B) overall survival (intention-to-treat population)
HR=hazard ratio.

Análisis por subgrupos

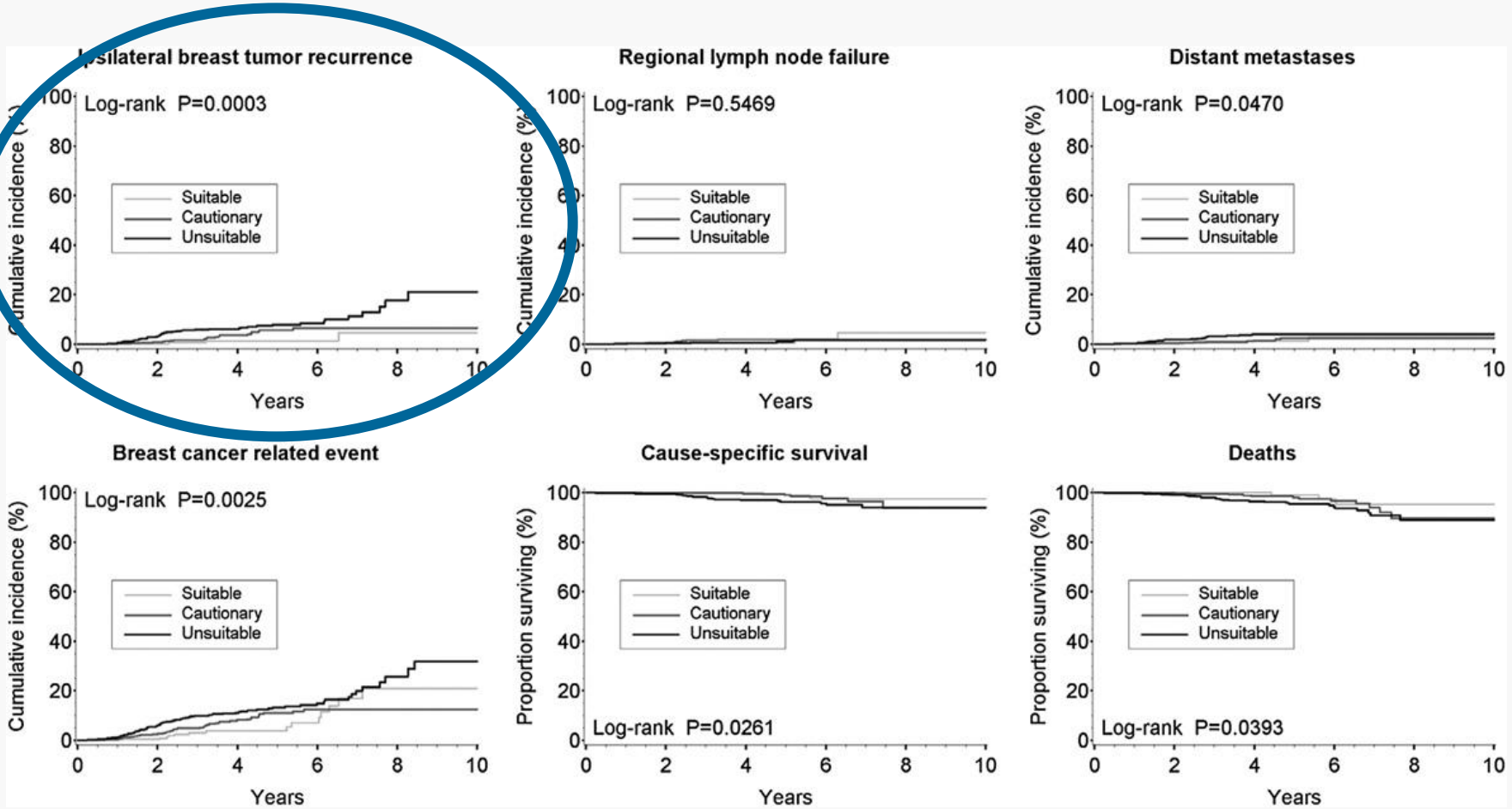
- Influencia en la RL p < 0.01:
  - Tamaño 2 cm
  - Grado G3
  - R Estrógeno negativo
  - Ki 67 > 20%
  - Subtipo Triple Negativo
- No diferencia significativa
  - Edad
  - Histología
  - Nº de ganglios

***Lancet Oncol* 2013; 14: 1269–77**

ELIOT (IEO, Milan)

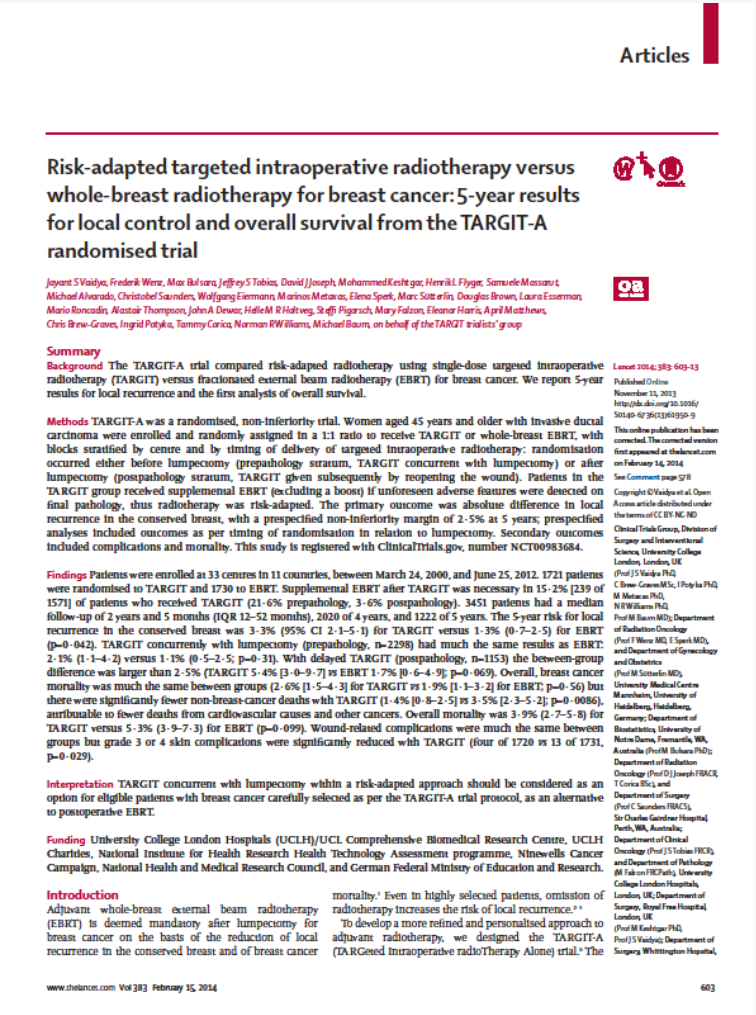
Milan ELIOT out- trial on 1822 patients
Stratification according to ASTRO groups

Int J Radiation Oncol Biol Phys, Vol. 83, No. 3, pp. 806e813, 2012



TARGIT-A (TARGeted Intraoperative radioTherapy Alone)

Onkologikoa



Articles

Risk-adapted targeted intraoperative radiotherapy versus whole-breast radiotherapy for breast cancer: 5-year results for local control and overall survival from the TARGIT-A randomised trial

Jayant S Vaidya, Frederik Wenz, Max Bulsara, Jeffrey S Tobias, David J Joseph, Mohammed Keshtgar, Henrik L Flyger, Samuele Massarut, Michael Alvarado, Christobel Saunders, Wolfgang Eiermann, Marinos Metaxas, Elena Sperk, Marc Sütterlin, Douglas Brown, Laura Esserman, Mario Roncadin, Alastair Thompson, John A Dewar, Helle M R Holtveg, Steffi Pigorsch, Mary Falzon, Eleanor Harris, April Matthews, Chris Brew-Graves, Ingrid Potyka, Tammy Corica, Norman RW Williams, Michael Baum, on behalf of the TARGIT trialists' group

Summary

Background The TARGIT-A trial compared risk-adapted radiotherapy using single-dose targeted intraoperative radiotherapy (TARGIT) versus fractionated external beam radiotherapy (EBRT) for breast cancer. We report 5-year results for local recurrence and the first analysis of overall survival.

Methods TARGIT-A was a randomised, non-inferiority trial. Women aged 45 years and older with invasive ductal carcinoma were enrolled and randomly assigned in a 1:1 ratio to receive TARGIT or whole-breast EBRT, with blocks stratified by centre and by timing of delivery of targeted intraoperative radiotherapy: randomisation occurred either before lumpectomy (prepathology stratum, TARGIT concurrent with lumpectomy) or after lumpectomy (postpathology stratum, TARGIT given subsequently by reopening the wound). Patients in the TARGIT group received supplemental EBRT (excluding a boost) if unforeseen adverse features were detected on final pathology, thus radiotherapy was risk-adapted. The primary outcome was absolute difference in local recurrence in the conserved breast, with a prespecified non-inferiority margin of 2·5% at 5 years; prespecified analyses included outcomes as per timing of randomisation in relation to lumpectomy. Secondary outcomes included complications and mortality. This study is registered with ClinicalTrials.gov, number NCT00983684.

Findings Patients were enrolled at 33 centres in 11 countries, between March 24, 2000, and June 25, 2012. 1721 patients were randomised to TARGIT and 1730 to EBRT. Supplemental EBRT after TARGIT was necessary in 15·2% [239 of 1571] of patients who received TARGIT (21·6% prepathology, 3·6% postpathology). 3451 patients had a median follow-up of 2 years and 5 months (IQR 12–52 months), 2020 of 4 years, and 1222 of 5 years. The 5-year risk for local recurrence in the conserved breast was 3·3% (95% CI 2·1–5·1) for TARGIT versus 1·3% (0·7–2·5) for EBRT (p=0·042). TARGIT concurrently with lumpectomy (prepathology, n=2298) had much the same results as EBRT: 2·1% (1·1–4·2) versus 1·1% (0·5–2·5; p=0·31). With delayed TARGIT (postpathology, n=1153) the between-group difference was larger than 2·5% (TARGIT 5·4% [3·0–9·7] vs EBRT 1·7% [0·6–4·9]; p=0·069). Overall, breast cancer mortality was much the same between groups (2·6% [1·5–4·3] for TARGIT vs 1·9% [1·1–3·2] for EBRT; p=0·56) but there were significantly fewer non-breast-cancer deaths with TARGIT (1·4% [0·8–2·5] vs 3·5% [2·3–5·2]; p=0·0086), attributable to fewer deaths from cardiovascular causes and other cancers. Overall mortality was 3·9% (2·7–5·8) for TARGIT versus 5·3% (3·9–7·3) for EBRT (p=0·099). Wound-related complications were much the same between groups but grade 3 or 4 skin complications were significantly reduced with TARGIT (four of 1720 vs 13 of 1731, p=0·029).

Interpretation TARGIT concurrent with lumpectomy within a risk-adapted approach should be considered as an option for eligible patients with breast cancer carefully selected as per the TARGIT-A trial protocol, as an alternative to postoperative EBRT.

Funding University College London Hospitals (UCLH)/UCL Comprehensive Biomedical Research Centre, UCLH Charities, National Institute for Health Research Health Technology Assessment programme, Ninewells Cancer Campaign, National Health and Medical Research Council, and German Federal Ministry of Education and Research.

Introduction

Adjuvant whole-breast external beam radiotherapy (EBRT) is deemed mandatory after lumpectomy for breast cancer on the basis of the reduction of local recurrence in the conserved breast and of breast cancer mortality.[1] Even in highly selected patients, omission of radiotherapy increases the risk of local recurrence.[2,3]

To develop a more refined and personalised approach to adjuvant radiotherapy, we designed the TARGIT-A (TARGeted Intraoperative radioTherapy Alone) trial.[4] The

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See Comment page 578

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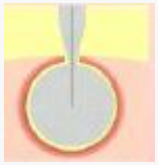
n: 3451
>45 a
CDI, BCS
cT1-T2< 35 mm
cN0
Unifocales
Sin F de riesgo

Standard
WBI 45-50Gy
Boost 10-16 Gy
n: 1730

TARGIT
20 Gy x 1 f / superficie lecho
n: 1721



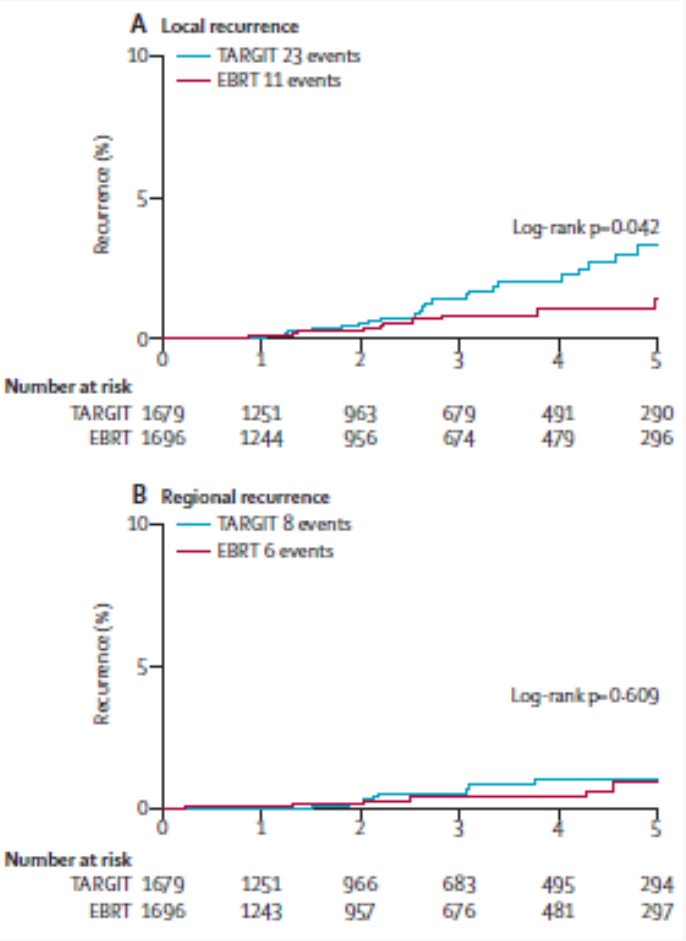
F. riesgo:
Tamaño > 35 mm
Otra histología LI
Margen < 1mm
CID>25%
Multifocalidad-multicentricidad
N+

RT externa adicional
15,2% 239

No F. riesgo

No más tratamiento

TARGIT-A (TARGeted Intraoperative radioTherapy Alone)



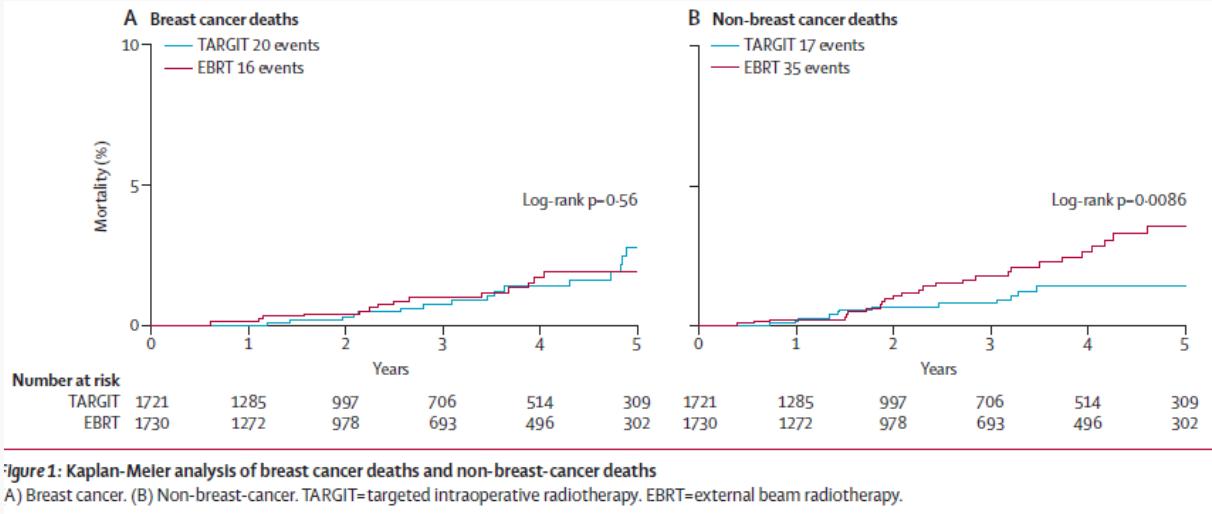


Figure 1: Kaplan-Meier analysis of breast cancer deaths and non-breast-cancer deaths
A) Breast cancer. (B) Non-breast-cancer. TARGIT=targeted intraoperative radiotherapy. EBRT=external beam radiotherapy.

- No diferencias significativas en **control local**, SLE , o SG.
- Muy baja incidencia de toxicidad en el grupo TARGIT
- Mejor resultado estético en grupo TARGIT

Lancet 2014; 383: 603–13

Indicaciones

Braquiterapia y Radioterapia Intraoperatoria, se utilizan en dos situaciones:

- Como boost (aumento de dosis en el lecho tumoral) tras Radioterapia externa

- En el contexto de irradiación parcial como terapia exclusiva con una buena selección en pacientes con bajo riesgo de recidiva.
  - Ca. Ductales infiltrantes, sin CID, sin multicentricidad
  - pT1N0M0
  - Márgenes quirúrgicos >2 mm
  - No IVL
  - No QTNA

Irradiación parcial en Onkologikoa

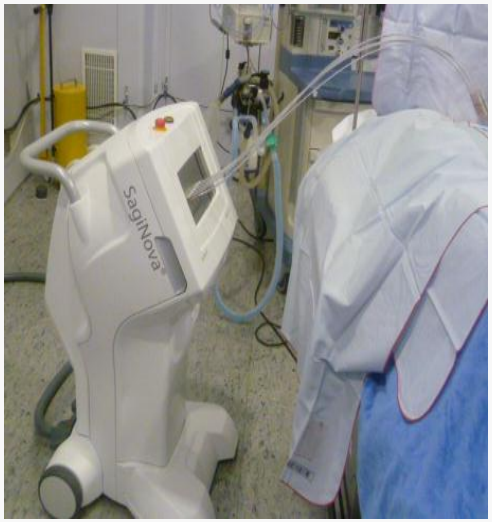
Agosto 2011-Diciembre 2015

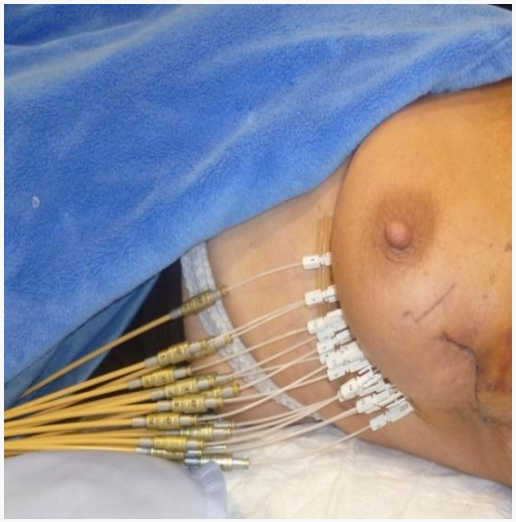
- Entre Agosto de 2011 y Diciembre 2015, han sido tratadas con BT intersticial multicatéter con Iridio 192, 36 pacientes, de acuerdo con las recomendaciones ASTRO

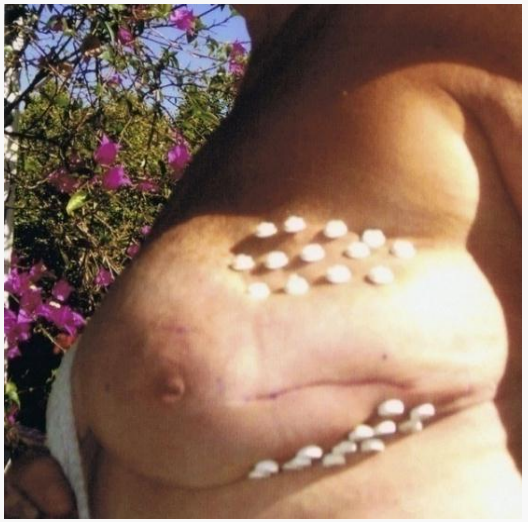
CDI GI-GII pT1N0M0	100%
Media edad	64 años
Media tamaño tumoral	9,8 mm (4-16)
Media márgenes	5.5 mm (2-20)
Nº Ganglios extraídos	2.8 (1-6)
RH	+ 100%
Ki 67	14,6 %
Her2 no amplificado	100% (0-2+)

Irradiación parcial en Onkologikoa

Agosto 2011-Diciembre 2015







- Ingreso en el Hospital durante 24 horas
- Tratamiento ambulatorio. (excepto en 2 casos)
- Todas las pacientes finalizaron el tratamiento según el plan previsto
- Tras la ultima sesión el implante se retiró sin anestesia.

Irradiación parcial en Onkologikoa

Agosto 2011-Diciembre 2015

RESULTADOS

- Seguimiento medio: 29 meses

- Ninguna recidiva loco-regional ni a distancia
- Muy buen resultado estético

- Toxicidad aguda:
  - Dolor en 2 pacientes.
  - Hematoma en 3 pacientes.
  - No se observaron radiodermitis agudas
- Toxicidad tardía:
  - Fibrosis grado 1 en 3 pacientes. (fibrosis postquirúrgica previa)
  - En 2 pacientes leve pigmentación en los puntos de entrada de los catéteres (de tipo cicatricial)

CONCLUSIONES

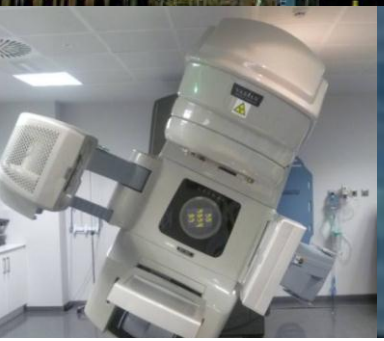
- Las técnicas de alto gradiente de dosis IMRT-Tomoterapia deben reservarse para cuando se obtenga un beneficio real, en la relación eficacia / toxicidad. En el caso de la mama cuando hay que tratar áreas ganglionares.

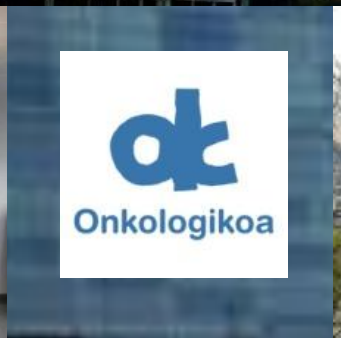
- Los protocolos de hipofraccionamiento poco a poco van instalándose en la practica diaria y ya es considerado un nuevo estándar cuando irradiamos solo la mama.

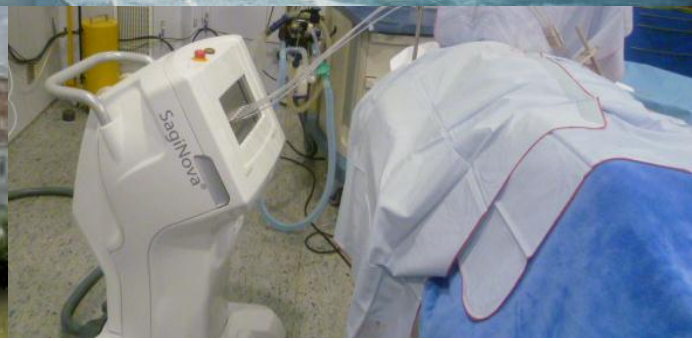
- La irradiación parcial ha incrementado sus indicaciones, se perfila como estándar en el futuro para un grupo determinado y bien seleccionado de pacientes.

  Hasta el momento, y fuera de ensayo seguir las recomendaciones de ESTRO / ASTRO.

  - Viable gracias a tecnologías de alta precisión.
  - Los resultados preliminares de los estudios en marcha son buenos pero faltan resultados a mas largo plazo
  - Se perfila como una buena modalidad terapéutica Medico-Económica







MUCHAS GRACIAS POR VUESTRA ATENCION