

**ASSOCIAZIONE ITALIANA RADIOTERAPIA ONCOLOGICA**  
Piemonte Valle d'Aosta Liguria



**Sanremo**  
**13 dicembre 2014**

**V CONVEGNO**  
GRUPPO INTERREGIONALE AIRO

Presidente del Convegno: Marco Orsatti

**attualità e progressi** nella

**radioterapia**  
**del tumore della mammella**

**APBI: A CHE PUNTO STIAMO?**

MARCO GATTI

**QUAL' E' IL RAZIONALE DELLA  
IRRADIAZIONE PARZIALE DELLA  
MAMMELLA?**

## RAZIONALE

- Non è più attuale proporre la stessa radioterapia a tutte le pazienti, soprattutto in un ottica di una moderna personalizzazione del trattamento e del concetto di *“déescalade thérapeutique”*
- L'irradiazione della mammella in toto non è sempre semplice da effettuare sia per motivi di età delle pazienti sia per motivi logistici e socio-economici, al punto che in particolari situazioni il ricorso alla mastectomia è ancora significativo.

## RAZIONALE

- La filosofia attuale del trattamento locale del carcinoma della mammella prevede il trattamento dell'intera ghiandola facendo ricorso alla mastectomia totale o associando alla chirurgia conservativa la radioterapia sulla mammella residua.
- Studi istopatologici recenti suggeriscono che nelle pazienti candidate ad una chirurgia conservativa secondo le linee guida attuali sia improbabile l'estensione microscopica di malattia oltre 1 cm dai margini di resezione chirurgica.

*Imamura H et al, Breast Cancer Res Treat 2000;62:177–184*

*Ohtake T et al., Cancer 1995;76:32–45.*

## RAZIONALE

- Un altro dato a sostegno della irradiazione parziale della mammella deriva dal fatto che la maggior parte delle recidive locali (85-90%) si verificano nel quadrante mammario dove era localizzata la neoplasia primitiva (*Veronesi et al. Ann Surg Oncol 2001-Malmström et al., Cancer 2003*)
- Il rischio di sviluppare una recidiva omolaterale al di fuori del quadrante interessato è simile a quello di sviluppare un tumore controlaterale (*Veronesi, 2001*) ed è quindi da considerarsi un secondo tumore.
- La RT non diminuisce il tasso di recidiva al di fuori del quadrante interessato

- **Alla luce delle nuove acquisizioni si è assistito ad una revisione dello standard terapeutico del trattamento radioterapico del carcinoma della mammella**
- **Studio di nuove metodiche di irradiazione finalizzate a diminuire la tossicità mediante l'utilizzo di tecniche sofisticate: la radioterapia conformazionale tridimensionale (3D-CRT), la radioterapia a modulazione di intensità (IMRT), la Tomoterapia, la brachiterapia e infine la radioterapia intraoperatoria (IORT)**
- **Accelerare il trattamento somministrando dosi più alte per frazione consentite dalla diminuzione dei volumi d'irradiazione (APBI)**

## ACCELERATED PARTIAL BREAST IRRADIATION USING 3D CONFORMAL RADIATION THERAPY (3D-CRT)

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ROBERT C. FRAZIER, M.D., JULIE FAYAD, M.S., LARRY L. KESTIN, M.D.,  
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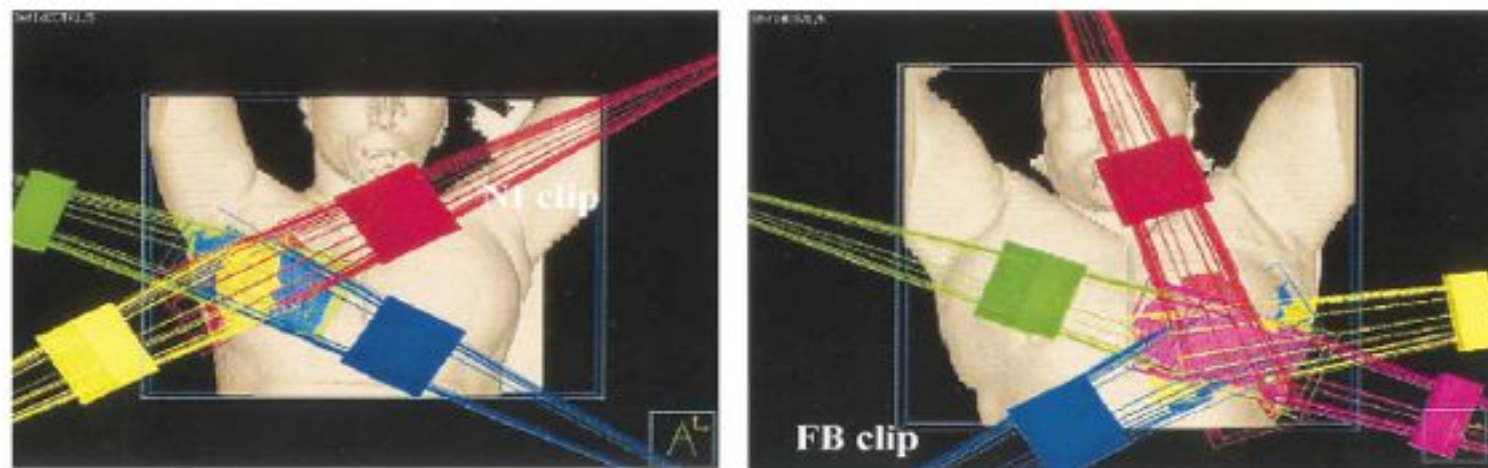
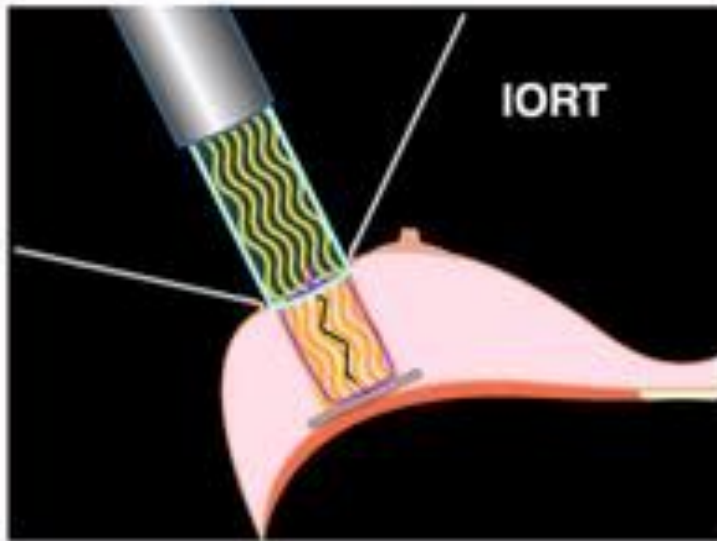


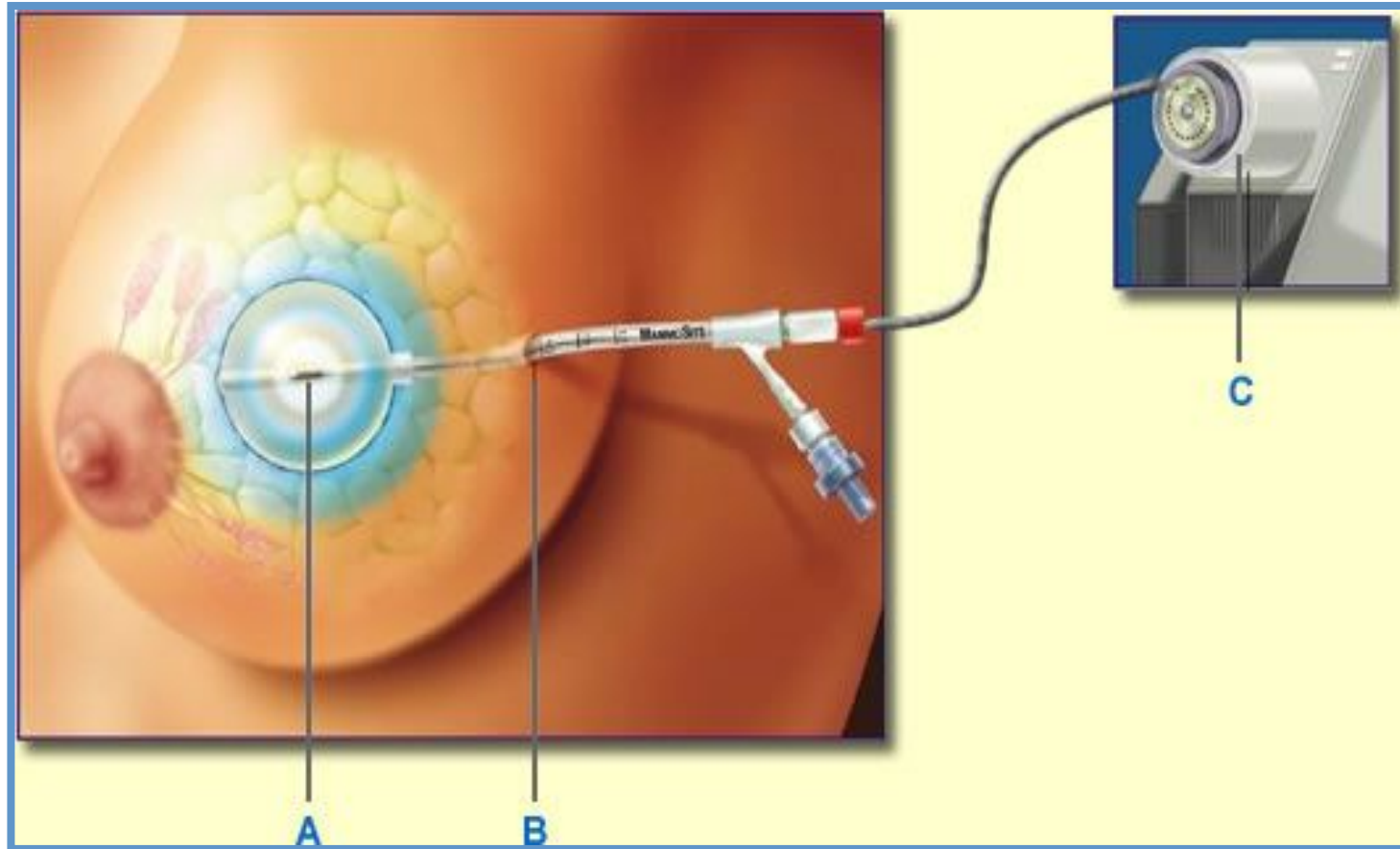
Fig. 1. Typical 4-field arrangement for right-sided lesions and 5-field arrangement for left-sided lesions.

# IORT





# Mammosite RTS



***A small balloon catheter    B radioactive seed***

***C afterloader***

# IMPLICAZIONI RADIOBIOLOGICHE

- Come si ottiene la dose equivalente a 60 Gy sul letto tumorale mediante l'utilizzo di un frazionamento non convenzionale?
- Il modello lineare quadratico è il più utilizzato:

$$D1/D2 = d2/d1 + \alpha/\beta / \alpha/\beta$$

D1= dose totale conv.

D2= nuova dose equivalente

d1=dose per frazione conv.

d2=nuova dose per frazione equivalente

$\alpha/\beta$ =coeff. risp. lineare e quadratico della “dose dependence”

## IMPLICAZIONI RADIOBIOLOGICHE

Il rapporto  $\alpha/\beta$  è ricavato empiricamente e nel caso specifico della mammella equivale a circa 4.

➤ 32 Gy/8 fraz.= 42,7 Gy con  $\alpha/\beta=4$

➤ 34 Gy/10 fraz.= 41,9 Gy con  $\alpha/\beta=4$

➤ 38.5 Gy/10 fraz.=50,4Gy  $\alpha/\beta=4$

## IMPLICAZIONI RADIOBIOLOGICHE

- **Le dosi ottenute sono chiaramente inferiori alle dosi utilizzate comunemente nello schema tradizionale, tuttavia la maggior parte degli autori ritengono che una paziente selezionata per PBI e quindi “low risk” richieda una dose inferiore per ottenere un controllo locale equivalente**

*Bartelink et al., N Engl J Med 2001;345:1378–87.*

RESEARCH

Open Access

# Higher toxicity with 42 Gy in 10 fractions as a total dose for 3D-conformal accelerated partial breast irradiation: results from a dose escalation phase II trial

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**Conclusions:** Early toxicities were more severe and higher rates of late toxicities were observed after 42 Gy/10 fractions/5 days when compared to 40 Gy/10 fractions/5 days. This data suggest that 40 Gy/10 fractions/ 5 days could potentially be the maximum tolerance for PBI although longer follow-up is warranted to better assess late toxicities.

***Studi prospettici non  
randomizzati di fase II***

**ACCELERATED PARTIAL BREAST IRRADIATION: 5-YEAR RESULTS OF THE  
GERMAN-AUSTRIAN MULTICENTER PHASE II TRIAL USING INTERSTITIAL  
MULTICATHETER BRACHYTHERAPY ALONE AFTER  
BREAST-CONSERVING SURGERY**

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JOSEF HAMMER, M.D.,<sup>¶</sup> MARION HINDEMITH, M.D.,<sup>†</sup> ALEXANDRA RESCH, M.D.,<sup>§</sup> KURT SPIEGL, M.D.,<sup>¶</sup>  
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274 pts (HDR 32Gy):

- *Tasso di recidiva locale a 5 aa: 2.9%*
- *Risultato cosmetico: buono/eccellente 92%*
- *Fibrosi grado 3/steatonecrosi: 19,3/4,7 %*



Contents lists available at ScienceDirect

## Radiotherapy and Oncology

journal homepage: [www.thegreenjournal.com](http://www.thegreenjournal.com)



Accelerated partial breast irradiation

### Accelerated partial-breast irradiation using high-dose-rate interstitial brachytherapy: 12-year update of a prospective clinical study

Csaba Polgár<sup>a,\*</sup>, Tibor Major<sup>a</sup>, János Fodor<sup>a</sup>, Zoltán Sulyok<sup>b</sup>, András Somogyi<sup>a</sup>, Katalin Lövey<sup>a</sup>, György Németh<sup>a</sup>, Miklós Kásler<sup>c</sup>

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45 pts (HDR 30.3/36.4 Gy):

- *Tasso di recidiva locale a 5/10-12 aa: 4,4/9.3%*
- *Risultato cosmetico: buono/eccellente 77,8%*
- *Fibrosi grado 3 e steatonecrosi: 2.2%*



**FIVE-YEAR ANALYSIS OF TREATMENT EFFICACY AND COSMESIS BY THE  
AMERICAN SOCIETY OF BREAST SURGEONS MAMMOSITE BREAST  
BRACHYTHERAPY REGISTRY TRIAL IN PATIENTS TREATED WITH ACCELERATED  
PARTIAL BREAST IRRADIATION**

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VIC ZANNIS, M.D.,<sup>||</sup> RICKY FINE, M.D.,<sup>¶</sup> PAT WHITWORTH, M.D.,<sup>#</sup> HENRY KUERER, M.D.,\*\*  
BRUCE HAFFTY, M.D.,<sup>††</sup> MARTIN KEISCH, M.D.,<sup>‡‡</sup> AND MAUREEN LYDEN, M.S.<sup>§§</sup>

\*Department of Radiation Oncology, William Beaumont Hospital, Royal Oak, MI; <sup>†</sup>Department of Surgery, Dallas Breast Center, Dallas, TX; <sup>‡</sup>Arizona Breast Cancer Specialists, Scottsdale, AZ; <sup>§</sup>Department of Surgery, Sacred Heart Hospital, Allentown, PA; <sup>||</sup>Department of Surgery, Breast Care Center of the Southwest, Phoenix, AZ; <sup>¶</sup>The Breast Center, Marietta, GA; <sup>#</sup>Nashville Breast Center, Nashville, TN; \*\*Department of Surgery, M.D. Anderson Cancer Center, Houston, TX; <sup>††</sup>Robert Wood Johnson University Hospital/ Cancer Institute of New Jersey, New Brunswick, NJ; <sup>‡‡</sup>Cancer HealthCare Associates, University of Miami Hospital, Miami, FL; and <sup>§§</sup>BioStat International, Tampa, FL

1440 pts FU (34 Gy 10 fraz.): 54 mesi

- *Tasso di recidiva locale a 5 aa: 3,04%*
- *Risultato cosmetico: buono/eccellente 90,6%*
- *Sieromi/steatonecrosi: 13/2.3%*

Clinical Investigation: Breast Cancer

## External Beam Accelerated Partial-Breast Irradiation Using 32 Gy in 8 Twice-Daily Fractions: 5-Year Results of a Prospective Study

Itai M. Pashtan, MD,<sup>\*</sup> Abram Recht, MD,<sup>†</sup> Marek Ancukiewicz, PhD,<sup>‡</sup> Elena Brachtel, MD,<sup>§</sup> Rita F. Abi-Raad, MD,<sup>‡</sup> Helen A. D'Alessandro, MD,<sup>||</sup> Antonin Levy, MD,<sup>‡,1</sup> Jennifer Y. Wo, MD,<sup>‡</sup> Ariel E. Hirsch, MD,<sup>¶</sup> Lisa A. Kachnic, MD,<sup>\*\*</sup> Saveli Goldberg, PhD,<sup>‡</sup> Michelle Specht, MD,<sup>\*\*</sup> Michelle Gadd, MD,<sup>\*\*</sup> Barbara L. Smith, MD, PhD,<sup>\*\*</sup> Simon N. Powell, MD, PhD,<sup>‡,2</sup> and Alphonse G. Taghian, MD, PhD<sup>‡</sup>

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**98 pts (32 Gy 8 fraz.) FU: 71 mesi**

➤ *Tasso di recidiva locale a 5 aa: 5%*

➤ *Risultati favorevoli nei pz. ER+*

➤ *Risultati sfavorevoli nei pz “triple negative”*

## CONSENSUS STATEMENT

### ACCELERATED PARTIAL BREAST IRRADIATION CONSENSUS STATEMENT FROM THE AMERICAN SOCIETY FOR RADIATION ONCOLOGY (ASTRO)

Table 2. Patients “suitable” for APBI if all criteria are present

Factor	Criterion
Patient factors	
Age	≥60 y
<i>BRCA1/2</i> mutation	Not present
Pathologic factors	
Tumor size	≤2 cm*
T stage	T1
Margins	Negative by at least 2 mm
Grade	Any
LVSI	No <sup>†</sup>
ER status	Positive
Multicentricity	Unicentric only
Multifocality	Clinically unifocal with total size ≤2.0 cm <sup>†</sup>
Histology	Invasive ductal or other favorable subtypes <sup>§</sup>
Pure DCIS	Not allowed
EIC	Not allowed
Associated LCIS	Allowed
Nodal factors	
N stage	pN0 (i <sup>-</sup> , i <sup>+</sup> )
Nodal surgery	SN Bx or ALND <sup>  </sup>
Treatment factors	
Neoadjuvant therapy	Not allowed

Table 3. “Cautionary” group: Any of these criteria should invoke caution and concern when considering APBI

Factor	Criterion
Patient factors	
Age	50–59 y
Pathologic factors	
Tumor size	2.1–3.0 cm*
T stage	T0 or T2
Margins	Close (<2 mm)
LVSI	Limited/focal
ER status	Negative <sup>†</sup>
Multifocality	Clinically unifocal with total size 2.1–3.0 cm <sup>†</sup>
Histology	Invasive lobular
Pure DCIS	≤3 cm
EIC	≤3 cm

## CONSENSUS STATEMENT

### ACCELERATED PARTIAL BREAST IRRADIATION CONSENSUS STATEMENT FROM THE AMERICAN SOCIETY FOR RADIATION ONCOLOGY (ASTRO)

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THOMAS B. JULIAN, M.D.,<sup>#</sup> LAWRENCE B. MARKS, M.D.,<sup>\*\*</sup> DORIN A. TODOR, PH.D.,<sup>‡</sup>  
FRANK A. VICINI, M.D.,<sup>††</sup> TIMOTHY J. WHELAN, M.D.,<sup>‡‡</sup> JULIA WHITE, M.D.,<sup>§§</sup> JENNIFER Y. WO, M.D.,<sup>|||</sup>  
AND JAY R. HARRIS, M.D.<sup>¶¶</sup>

Table 4. Patients “unsuitable” for APBI outside of a clinical trial if any of these criteria are present

Factor	Criterion
Patient factors	
Age	<50 y
<i>BRCA1/2</i> mutation	Present
Pathologic factors	
Tumor size*	>3 cm
T stage	T3-4
Margins	Positive
LVSI	Extensive
Multicentricity	Present
Multifocality	If microscopically multifocal >3 cm in total size or if clinically multifocal
Pure DCIS	If >3 cm in size
EIC	If >3 cm in size
Nodal factors	
N stage	pN1, pN2, pN3
Nodal surgery	None performed
Treatment factors	
Neoadjuvant therapy	If used

## GEC-ESTRO Recommendations

### Patient selection for accelerated partial-breast irradiation (APBI) after breast-conserving surgery: Recommendations of the Groupe Européen de Curiethérapie-European Society for Therapeutic Radiology and Oncology (GEC-ESTRO) breast cancer working group based on clinical evidence (2009)

GEC-ESTRO recommendations on patient selection for accelerated partial-breast irradiation.

Characteristic	A/low-risk group – good candidates for APBI	B/intermediate-risk group – possible candidates for APBI	C/high-risk group – contraindication for APBI
Patient age	>50 years	>40–50 years	≤40 years
Histology	IDC, mucinous, tubular, medullary, and colloid cc.	IDC, ILC, mucinous, tubular, medullary, and colloid cc	-
ILC	Not allowed	Allowed	-
Associated LCIS	Allowed	Allowed	-
DCIS	Not allowed	Allowed	-
HG	Any	Any	-
Tumour size	pT1–2 (≤30 mm)	pT1–2 (≤30 mm)	pT2 (>30 mm), pT3, pT4
Surgical margins	Negative (≥2 mm)	Negative, but close (<2 mm)	Positive
Multicentricity	Unicentric	Unicentric	Multicentric
Multifocality	Unifocal	Multifocal (limited within 2 cm of the index lesion)	Multifocal (>2 cm from the index lesion)
EIC	Not allowed	Not allowed	Present
LVI	Not allowed	Not allowed	Present
ER, PR status	Any	Any	-
Nodal status	pN0 (by SLNB or ALND <sup>a</sup> )	pN1mi, pN1a (by ALND <sup>a</sup> )	pNx; ≥pN2a (4 or more positive nodes)
Neoadjuvant chemotherapy	Not allowed	Not allowed	If used

# Original Study

## Five-Year Outcomes and Toxicities Using 3-Dimensional Conformal External Beam Radiation Therapy to Deliver Accelerated Partial Breast Irradiation

Chirag Shah,<sup>1</sup> J. Ben Wilkinson,<sup>2</sup> Thomas Lanni,<sup>2</sup> Maha Jawad,<sup>2</sup> Jessica Wobb,<sup>2</sup> Ashley Fowler,<sup>2</sup> Michelle Wallace,<sup>2</sup> Peter Chen,<sup>2</sup> Inga S. Grills,<sup>2</sup> Frank Vicini<sup>3</sup>

**192 pts (34/38.5 Gy 10 fraz.):** 37,5% *suitable*, 46,4% *cautionary*, 16,1% *insuitable* according to ASTRO

- *Tasso di recidiva locale a 5 aa: 0%*
- *Risultato cosmetico: buono/eccellente 81%*
- *Fibrosi grado 3: 7.6%*
- *Teleangectasie: 7.5%*



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## Radiotherapy and Oncology

journal homepage: [www.thegreenjournal.com](http://www.thegreenjournal.com)



Accelerated partial breast irradiation

Defining an optimal role for breast magnetic resonance imaging when evaluating patients otherwise eligible for accelerated partial breast irradiation



Kathleen C. Horst<sup>a,\*</sup>, Katherine E. Fero<sup>a</sup>, Debra M. Ikeda<sup>b</sup>, Bruce L. Daniel<sup>b</sup>, Frederick M. Dirbas<sup>c</sup>

<sup>a</sup> Department of Radiation Oncology; <sup>b</sup> Department of Radiology; <sup>c</sup> Department of Surgery, Stanford University School of Medicine, Stanford Cancer Institute, United States

- *La RM è stata in grado di identificare una malattia multifocale/multicentrica risp. nel 10.5 e nell' 1,6% dei 181 pazienti dello studio inizialmente candidati alla PBI con la stadiazione convenzionale*
- *L'età pre-menopausale e i tumori >2 cm sono i fattori di rischio maggiori*

***Studi prospettici  
randomizzati di fase III***



*Clin Oncol (R Coll Radiol). 1993;5(5):278-83.*

**The Christie Hospital breast conservation trial:  
an update at 8 years from inception.**

*Ribeiro GG1, Magee B, Swindell R, Harris M,  
Banerjee SS.*

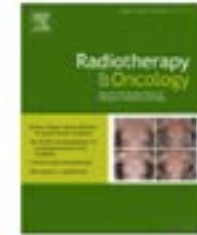
- *708 pts FU 65 mesi*
- *40/42.5 Gy/8 fraz./electroni vs whole breast*
- *Recidive locali 11% vs 15% nel CDI*
- *Recidive locali: 8% vs 34 % nel CLI*
- *Sopravvivenza sovrapponibile: 71.2 vs 72,7 %*



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Csaba Polgár<sup>a,\*</sup>, Tibor Major<sup>a</sup>, János Fodor<sup>a</sup>, Zoltán Sulyok<sup>b</sup>, András Somogyi<sup>a</sup>, Katalin Lövey<sup>a</sup>, György Németh<sup>a</sup>, Miklós Kásler<sup>c</sup>

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- **258 pts selez.+++:** 50 Gy/25 fraz whole breast vs APBI HDR 36,4 Gy/7 fraz o elettroni 6-15 Mev 50 Gy/25 fraz.
- Tasso di recidiva locale 5.1 vs 5.9 %
- DFS e OS: sovrapponibili
- Risultato cosmetico 81% buono/eccellente APBI vs 63% whole breast
- Scarso n. paz, tecniche APBI non confrontabili

Études randomisées de phase III rapportant les résultats d'efficacité en termes de contrôle local et de survie.

Études	n	Critères d'inclusion	Suivi médian (années)	Protocoles d'irradiation		Résultats	
						Taux de récurrences locales (%)	Taux de survie globale (%)
Budapest [47]	258	> 40 ans T1 unifocal non lobulaire grade 1-2 sans composante intracanaulaire extensive Marges chirurgicales saines pN0-1(mi)	5,5	ITS	50 Gy/25 fractions	3	91,8
				IPAS	HDD 36,4 Gy/7 fractions γ/e- 50 Gy/25 fractions	4,7	94,6
TARGIT-A [49]	2451	≥ 45 ans T1-2 unifocal non lobulaire sans composante intracanaulaire extensive Marges chirurgicales saines pN0-1	2,5	ITS	50 Gy/25 fractions ± boost	1,3	94,7
				IPAS	IORT 50 kV 20 Gy/1 fraction	3,3	96,1
ELIOT [50]	1305	48-75 ans T1-2 < 2,5 cm unicentrique pN0	5,8	ITS	50 Gy/25 fractions ± 10 Gy	0,4	96,9
				IPAS	IORT e- 21 Gy/1 fraction	4,4	96,8

ITS : irradiation de la totalité du sein ; IPAS : irradiation partielle et accélérée du sein ; HDD : curiethérapie de haut débit de dose ; γ : photons gamma de télécobalt ; e- : électrons ; IORT : irradiation intra-opératoire.

Études randomisées de phase III rapportant les résultats de toxicité et les résultats cosmétiques.

Études	n	Critères d'inclusion	Suivi médian (années)	Protocoles d'irradiation	Toxicité			
					Grade 1 (%)	Grade 2 (%)	Grade 3 (%)	
Gec-ESTRO [54]	1193	≥ 40 ans T1-2 ≤ 3 cm pN0-1(mi) marges chirurgicales ≥ 2 mm	1	ITS	50-50,4 ± 10 Gy	Épidermite : 49,5	-	Épidermite : 7,1
				IPAS	HDD 32-30,3 Gy PDR 50 Gy	Épidermite : 18,2	-	Épidermite : 0,2
NSABP B39 [56]	4300	≥ 18 ans CCI/CCIS T1-2 ≤ 3 cm ≤ 3N+ Marges chirurgicales > 0	3,4	ITS	50-50,4 ± 10-16 Gy	-	Fibrose ≤ 12	Fibrose ≤ 3
				IPAS	HDD 34 Gy/10 fractions			
RAPID [57] <sup>a</sup>	2135	≥ 40 ans CCI/CCIS T1-2 ≤ 3 cm pN0 Marges chirurgicales > 0 non BRCA1/2	3	ITS	50 ± 10 42,5 Gy	3	17*	
				IPAS	RC3D 38,5 Gy	12	30	

n : nombre de patients ; CCI : carcinome canalaire invasif ; CCIS : carcinome canalaire in situ ; ITS : irradiation de la totalité du sein ; IPAS : irradiation partielle et accélérée du sein ; HDD : curiethérapie de haut débit de dose ; PDR : pulsed dose rate ; RC3D : radiothérapie externe conformationnelle tridimensionnelle.

<sup>a</sup> Évaluation cosmétique faite pour l'ITS : par l'infirmier 17%/la patiente 18%/l'oncologue 17% (moyenne = 17%). Évaluation cosmétique faite pour l'IPAS : par l'infirmier 29%/la patiente 26%/l'oncologue 35% (moyenne 30%).



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## Radiotherapy and Oncology

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### Review

## Accelerated partial irradiation for breast cancer: Systematic review and meta-analysis of 8653 women in eight randomized trials

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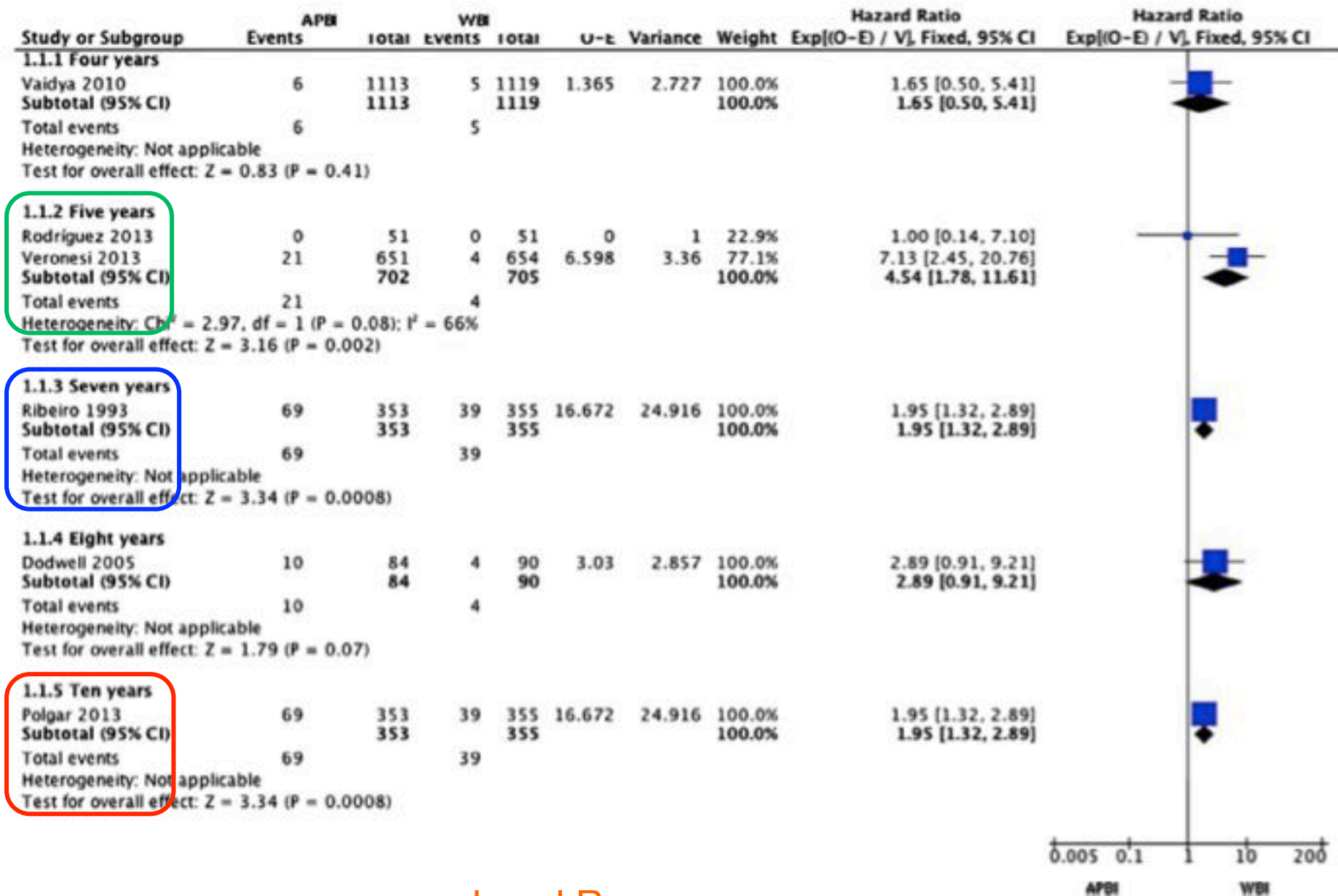
Characteristics of included studies.

Study	Patients (n)	Years of inclusion	Inclusion criteria	Tumor stage (n)			Nodal stage (n)			Grade (n)		ER+ (n)	HER-2+ (n)	WBI arm	APBI arm	Surgery	Che (n)		HT (n)	
				Tis	T1-T2	T3-T4	N0	N1-N2	N3	I-II	III						WBI	APBI	WBI	APBI
Dodwell	174	1985-1990	pT1-2 pN0-1	0	174	0	-	WBI 31% APBI 41%	133	41	-	-	40 Gy/ 15fx + boost (15 Gy/5fx)	55 Gy/20fx	Local excision and a level 2 ALND	90	84	90	84	
Livi	520	2005-2008	>40 years; T < 2.5 cm; unifocal tumor; no EIC	39	220	0	206	48	11	201	29	202*	-	50 Gy/25fx	30 Gy/5fx (IMRT)	Wide excision or quadrantectomy, clear margins (>5 mm)	8	7	73	68
Olivetto	2135	2006-2011	>40 years; DCIS; IDC < 3 cm; pN0	366	1752	0	2135	0	0	1425	302	1471	-	50 Gy/25fx (large breast size) or 42.5 Gy/16fx +/- boost	38.5 Gy/10fx twice daily	BCS, negative margins, negative SLNB or ALND	137	130	582	604
Polgar	258	1998-2004	Unifocal tumor; <pT2; cN0, pN0, or pN1mi (single nodal >0.2 mm and <2 mm); histologic grade <2	0	258	0	249	9	0	258	0	229	-	40-50 Gy/ 21-25fx	HDR MI 36.4 Gy/7fx or electrons 42-50 Gy/21-25fx	Wide excision, negative margins, ALND/SLNB in some cases	2	2	87	89
Ribeiro	708	1982-1987	<70 years; tumor <4 cm; cN0	-	708	0	-	-	-	-	-	-	-	40 Gy/15fx (breast and regional nodes)	40-42.5 Gy/8fx (electrons)	Lumpectomy, no ALND	0	0	0	0
Rodriguez	102	-	>60 years; IDC; unifocal tumor; <pT2; cN0 (pN0 axillary status); histologic grade <2	0	102	102	0	0	0	102	0	100	1	48 Gy/24fx +/- boost (10 Gy/5fx)	37.5 Gy/10fx twice daily	BCS	2	1	51	50
Veronesi	1305	2000-2007	48-75 years; tumor <2.5 cm	0	1305	0	949	276	69	989	274	1172	44	50 Gy/ 25fx + boost (10 Gy/5fx)	21 Gy/1fx (intraoperative electrons)	Quadrantectomy and SLNB or ALND	47	53	485	489
Vaidya	3451	2000-2012	>45 years; IDC; T1-T2; unifocal tumor; no EIC	0	3451	0	1764	304	61	1769	319	1943	264	40-56 Gy +/- boost 16 Gy	20 Gy (surface of the tumor bed)/5-7 Gy at 1 cm depth	Wide excision	141	116	753	727
Total	8653	-	-	405	7970	102	5303	637	141	4877	965	4915	309	-	-	-	427	393	2121	2111

Note: ALND - Axillary lymph node dissection; BCS - Breast-conserving surgery; Che - Adjuvant therapy with chemotherapy; DCIS - Ductal carcinoma in situ; EIC - Extensive intraductal carcinoma; ER+ - Estrogen receptors positive; HDR MI - High-dose-rate multicatheter interstitial; HER-2+ - HER-2 positive; HT - Adjuvant therapy with hormone; IDC - Invasive ductal carcinoma; IMRT - Intensity-modulated radiotherapy; LSVI - Lymphovascular space invasion; SLNB - Sentinel lymph node biopsy.

\* Hormonal receptors positive.

Accelerated partial breast irradiation: Meta-analysis



Local Recurrence

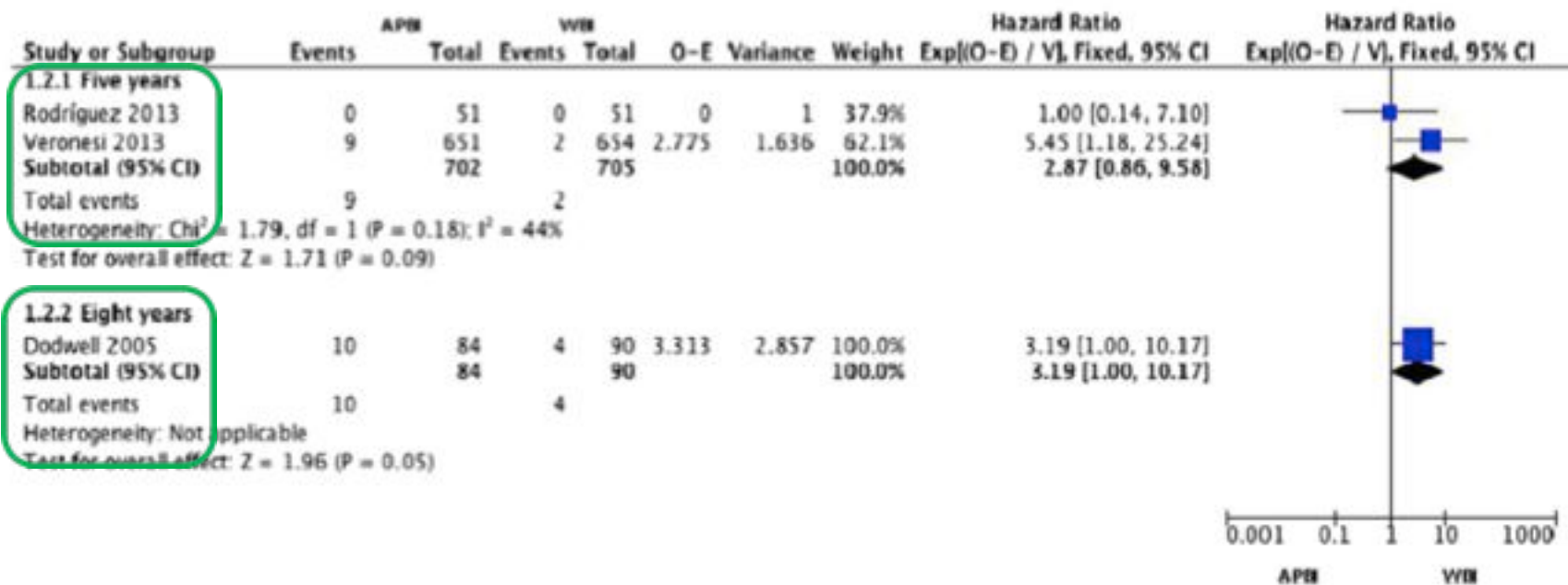


Fig. 2. Nodal recurrence.



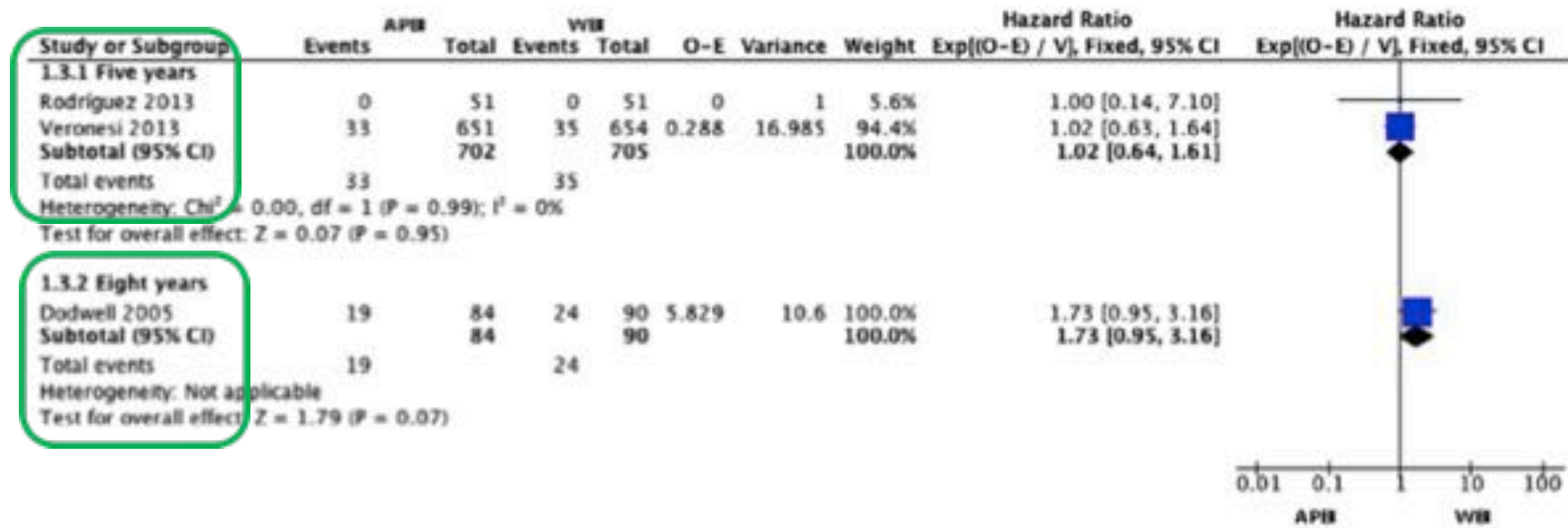


Fig. 3. Systemic recurrence.

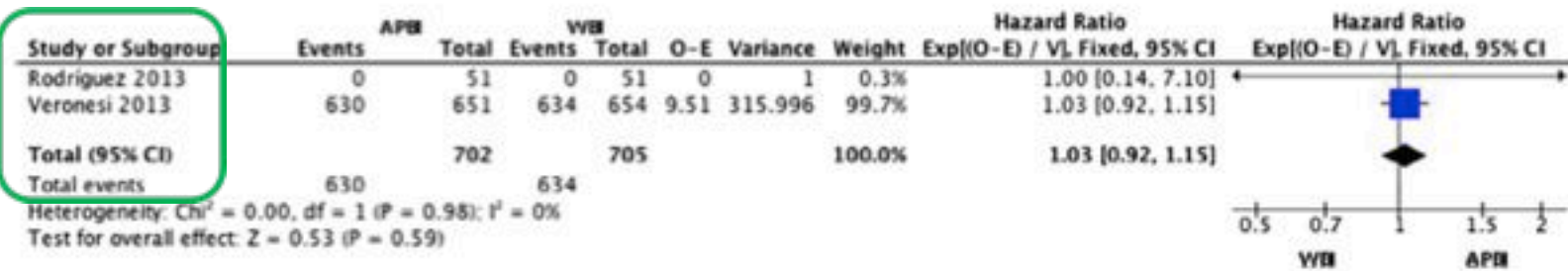


Fig. 4. Overall survival.

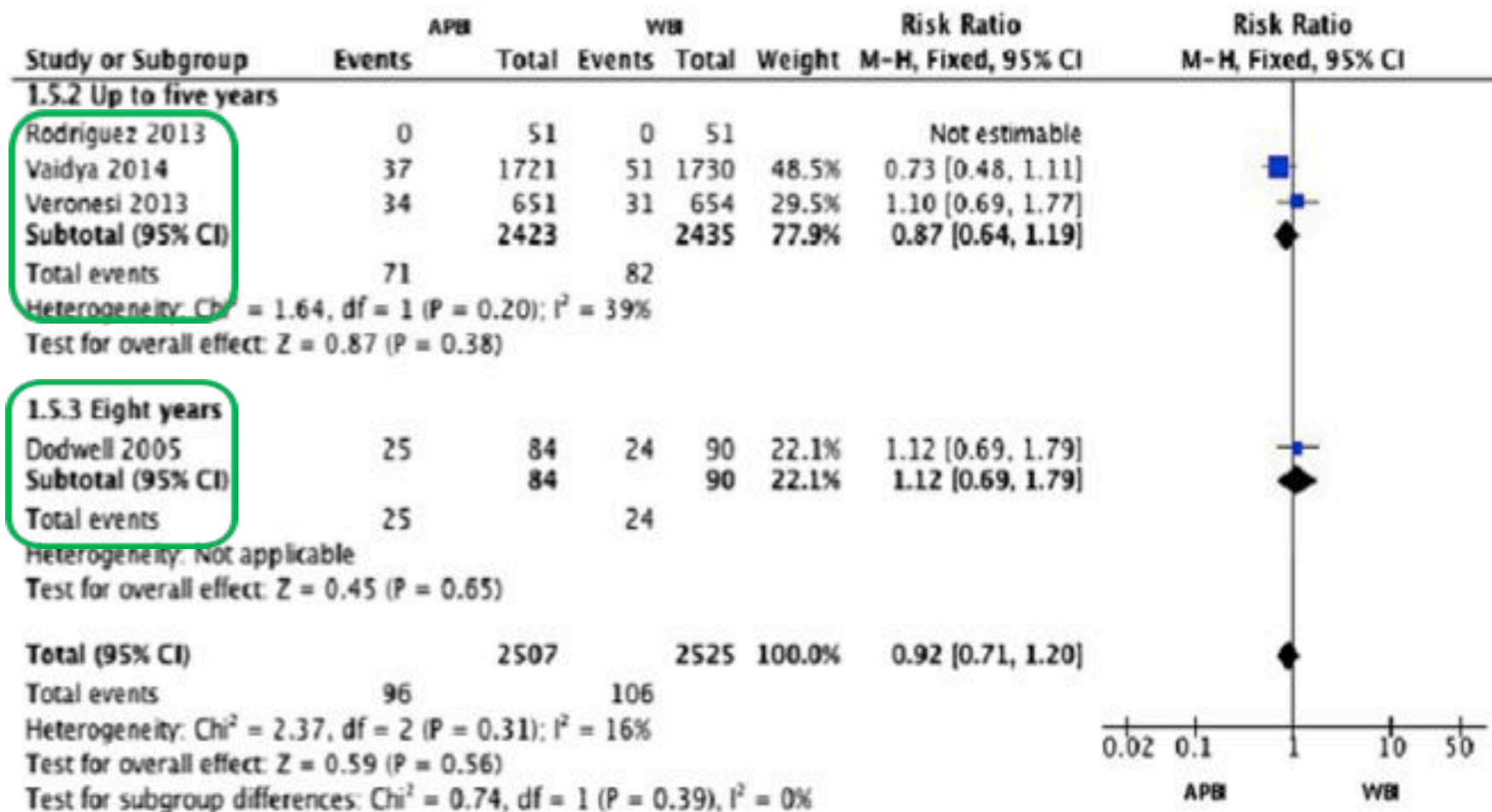


Fig. 5. Mortality.

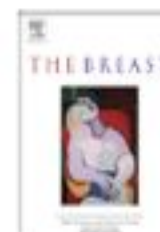
For Cosmesis, QoL, Toxicity: NS



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## The Breast

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Original article

### Accelerated partial breast irradiation using 3D conformal radiotherapy: Toxicity and cosmetic outcome



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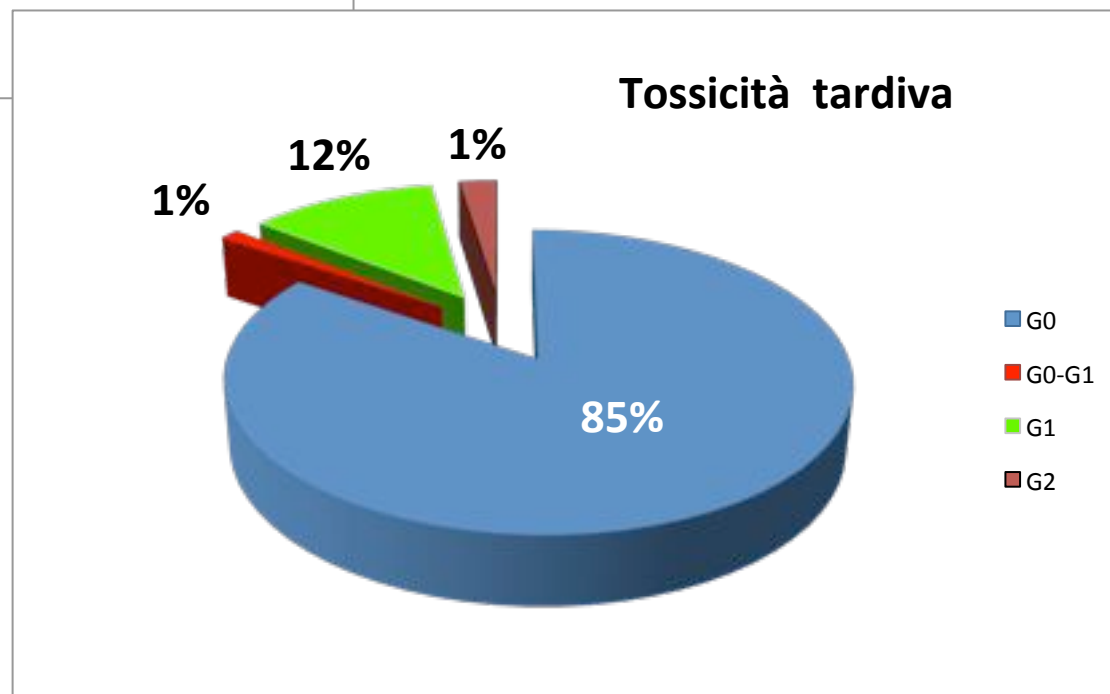
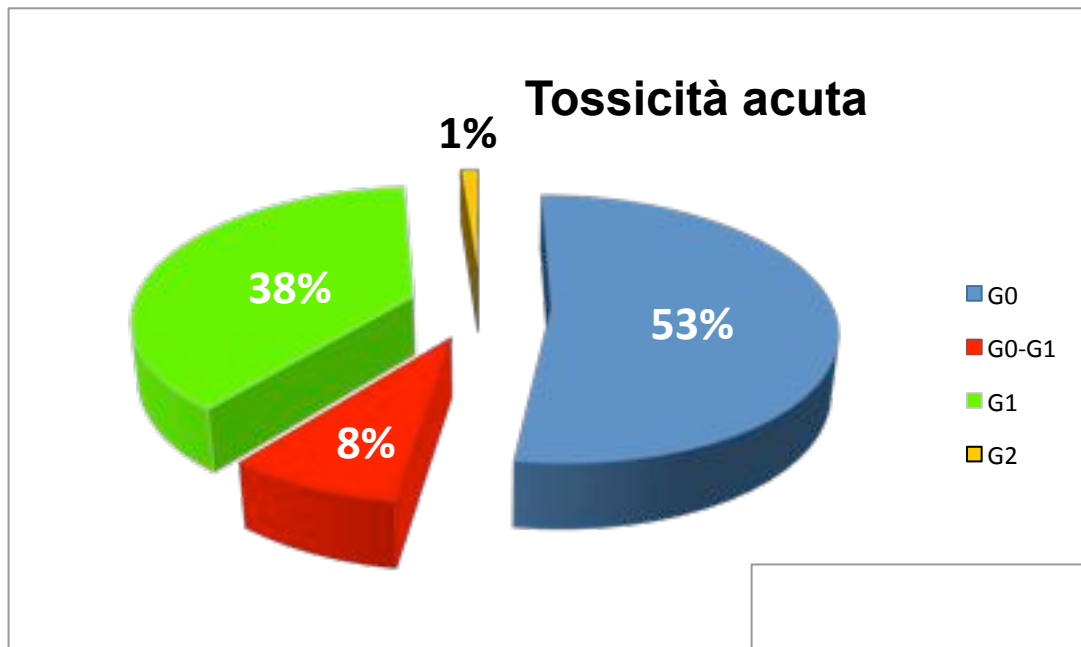
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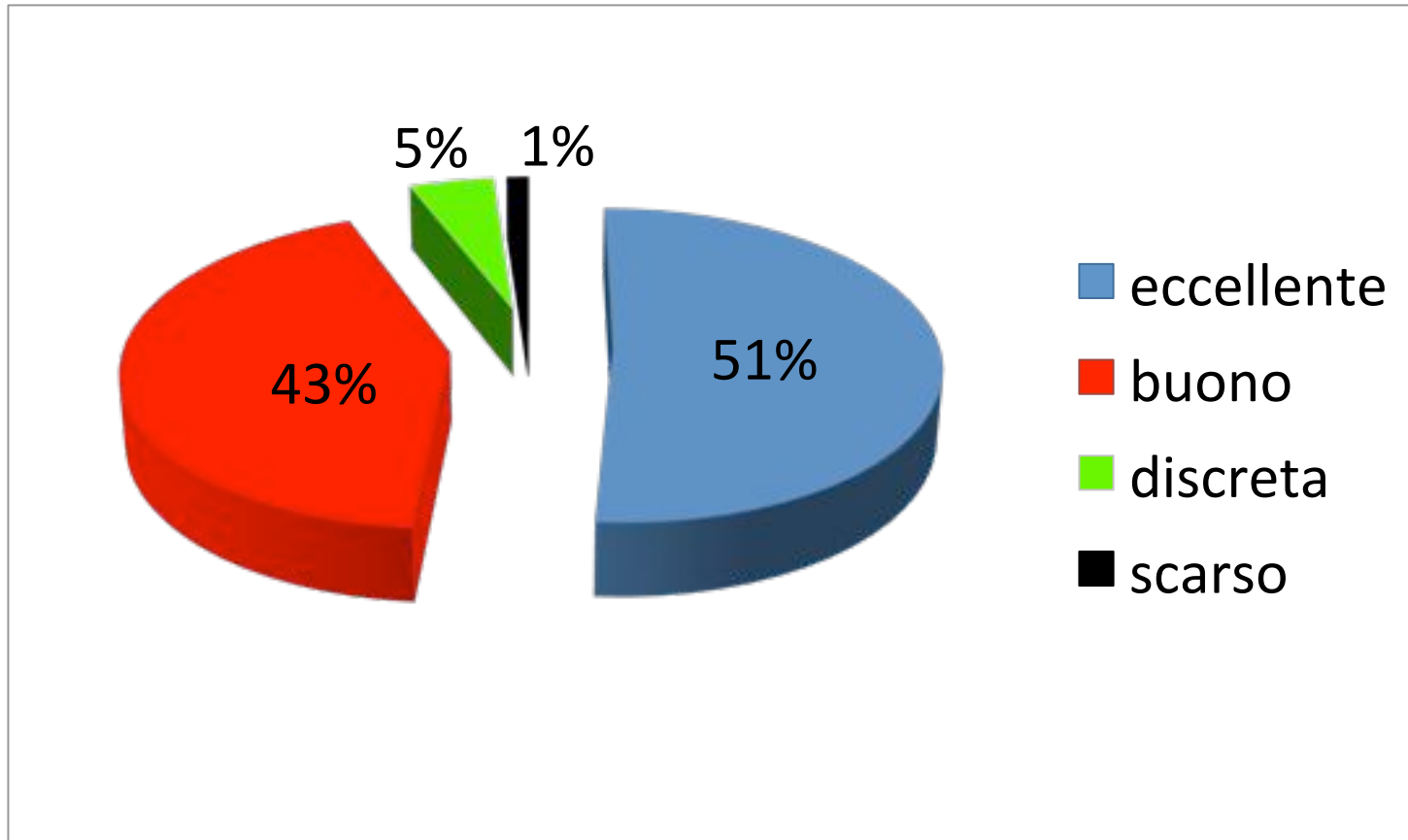
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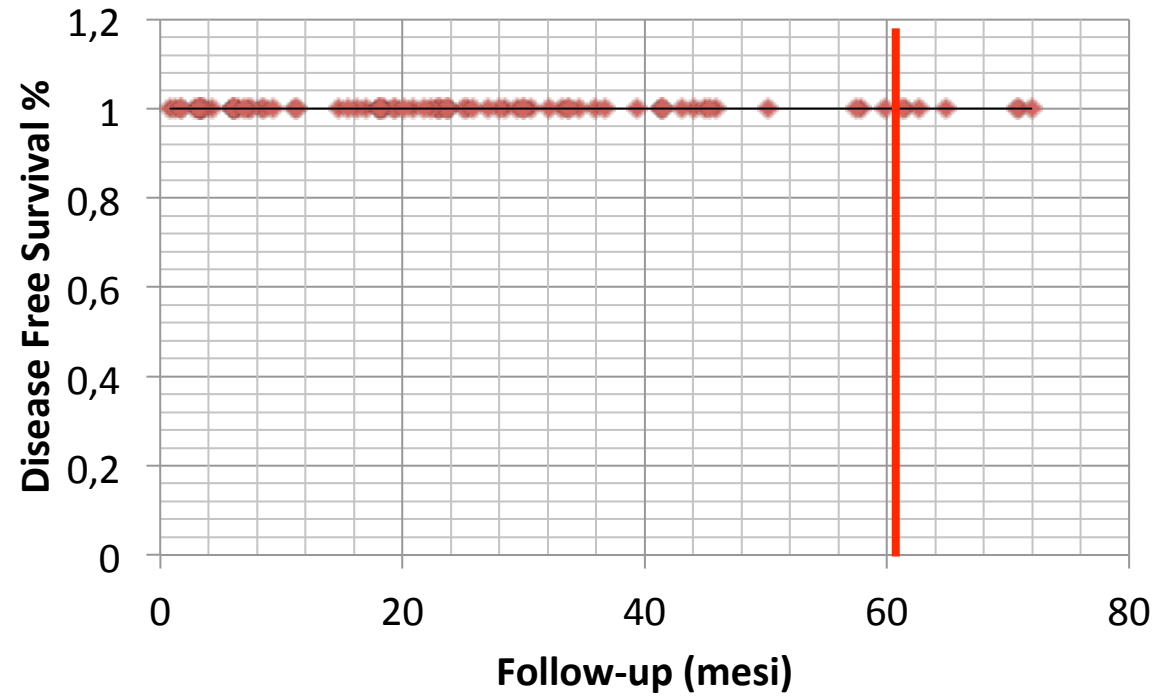
# Tossicità cutanea acuta e tardiva



# RESULTATO COSMETICO



# Sopravvivenza libera da malattia



8% dei pazienti con controllo > 5 anni

## CONCLUSIONI


- *L'APBI rispecchia la tendenza moderna a “trattare di meno” ma in maniera più precisa ed efficace aumentando l'indice terapeutico*
- *E' una tecnica che rispecchia il nuovo “credo” radioterapico: -volume + dose*
- *I volumi possono diminuire grazie ai progressi dell'imaging, alla conoscenza della malattia e allo screening*

## CONCLUSIONI

- *L'aumento della dose è la condizione necessaria per l'eradicazione della malattia.*
- *L'individuazione ottimale del volume bersaglio consentita dalle nuove tecniche RT deve corrispondere ad un'efficacia superiore e ad una diminuzione della dose somministrata ai tessuti sani*
- *Malgrado il progresso tecnico la dose somministrata al cuore nella **“whole breast”** permane un problema importante*



## CONCLUSIONI

- *Gli studi di APBI di fase II e i primi risultati degli studi di fase III evidenziano globalmente un basso tasso di recidive locali e una tossicità acuta e tardiva accettabile, tuttavia il FU è ancora limitato.*
- *I risultati della IORT possono generare perplessità, tuttavia è la tecnica che richiede la selezione più accurata.*
- *In termini di tossicità globale la radioterapia esterna segna il passo nei confronti della brachiterapia, dove però la selezione delle pazienti è più stretta:*
  -  *mammella grande, e tumori in prossimità della cute o della parete toracica.*

## CONCLUSIONI

- *Nelle pazienti anziane con tumori della mammella a basso rischio, l'APBI potrebbe essere un giusto compromesso tra l'astensione dal trattamento radioterapico proposto da alcune linee guida, e un'irradiazione di 4/5/6 settimane.*
- *Le Linee Guida ASTRO, ESTRO etc sembrano appropriate nell'aver individuato le pazienti candidabili alla PBI al di fuori di studi clinici.*

## CONCLUSIONI

- *Non è proponibile un atteggiamento minimalista verso tutte le pazienti ma non è nemmeno più proponibile il trattamento “whole breast” in tutti i casi → **personalizzazione del trattamento***
- *L’analisi sui possibili vantaggi economici dell’APBI sono discussi e controversi in letteratura (diverse politiche di rimborso e tecniche utilizzate)*
- *Certamente in termini di logistica, q.d.v. delle pazienti e impegno dei **“caregiver”** costituiscono un vantaggio non solo teorico.*