9 enseignement de chirurgie mammaire: les controverses

Traitement conservateur et irradiation partielle du sein : techniques et controverses

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Département de Radiothérapie
Centre Antoine Lacassagne – NICE

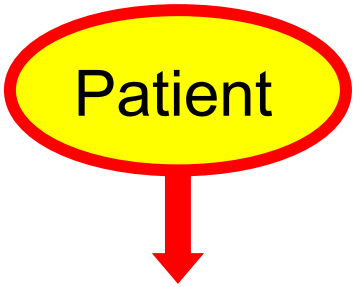
32èmes journées de la Société Française de sénologie, Strasbourg, 3 - 5 Novembre 2010

Développement

- Rationnel
- Historique
- Techniques
- Essais de phase III randomisés
- Consensus
- Perspectives

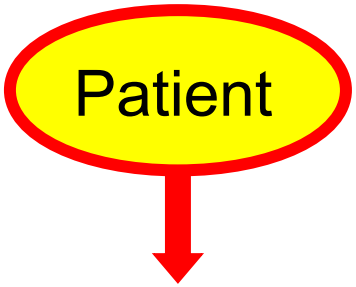

2163

Rationnel



↑ Qualité de vie
↓ Délai au retour à l'activité professionnelle
↓ Coût du traitement

Rationnel



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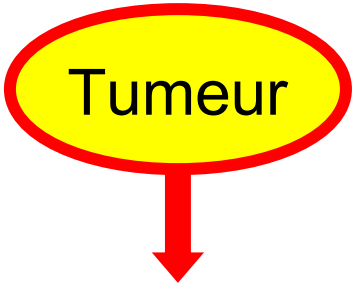
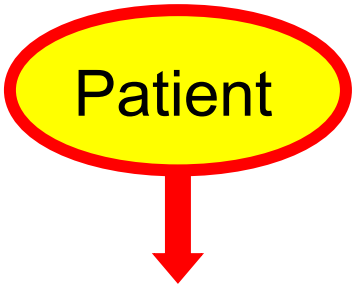


Données biologiques
Escalade de dose
Index thérapeutique

Rationnel



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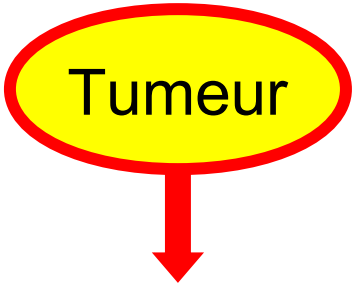

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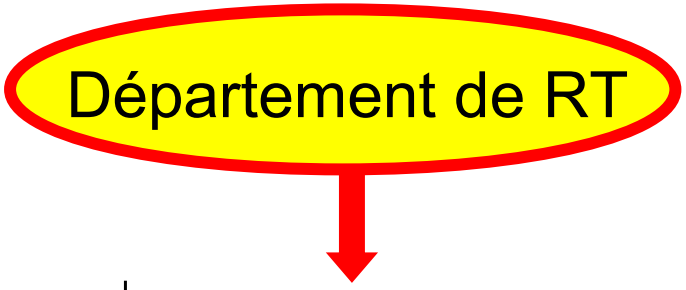
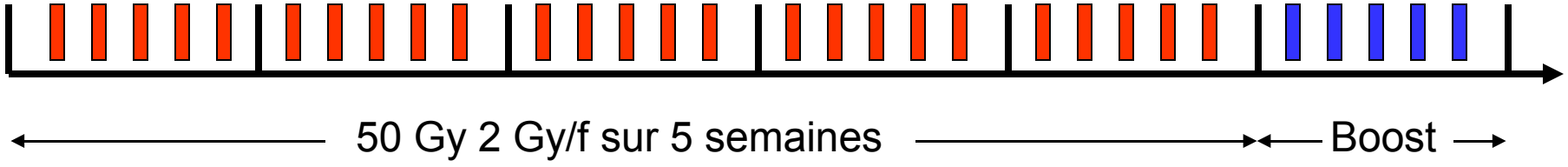
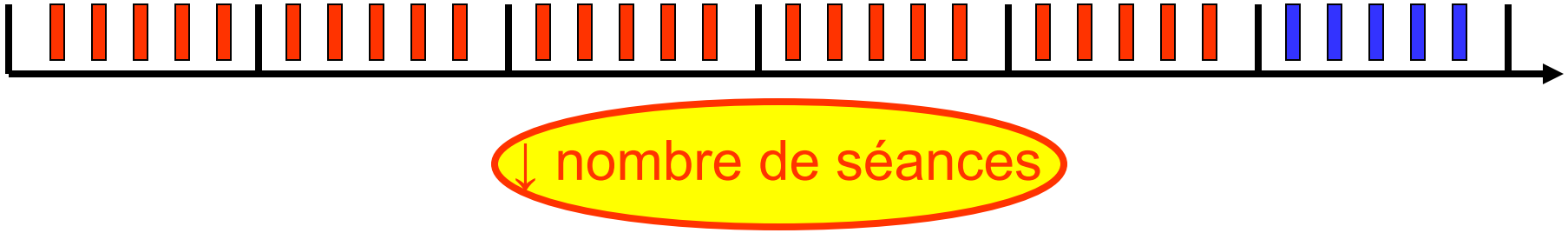
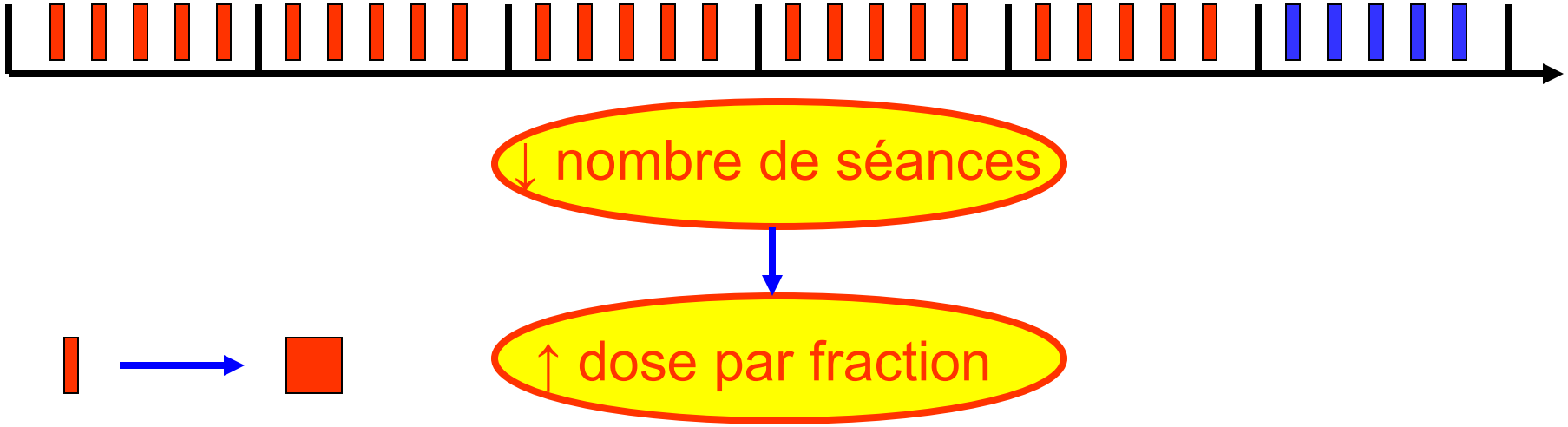


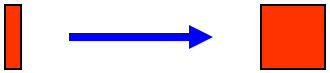
↓ Tps occupation linac
↑ # pts traités
↓ Délai thérapeutique


50 Gy 2 Gy/f sur 5 semaines
Boost


↓ nombre de séances

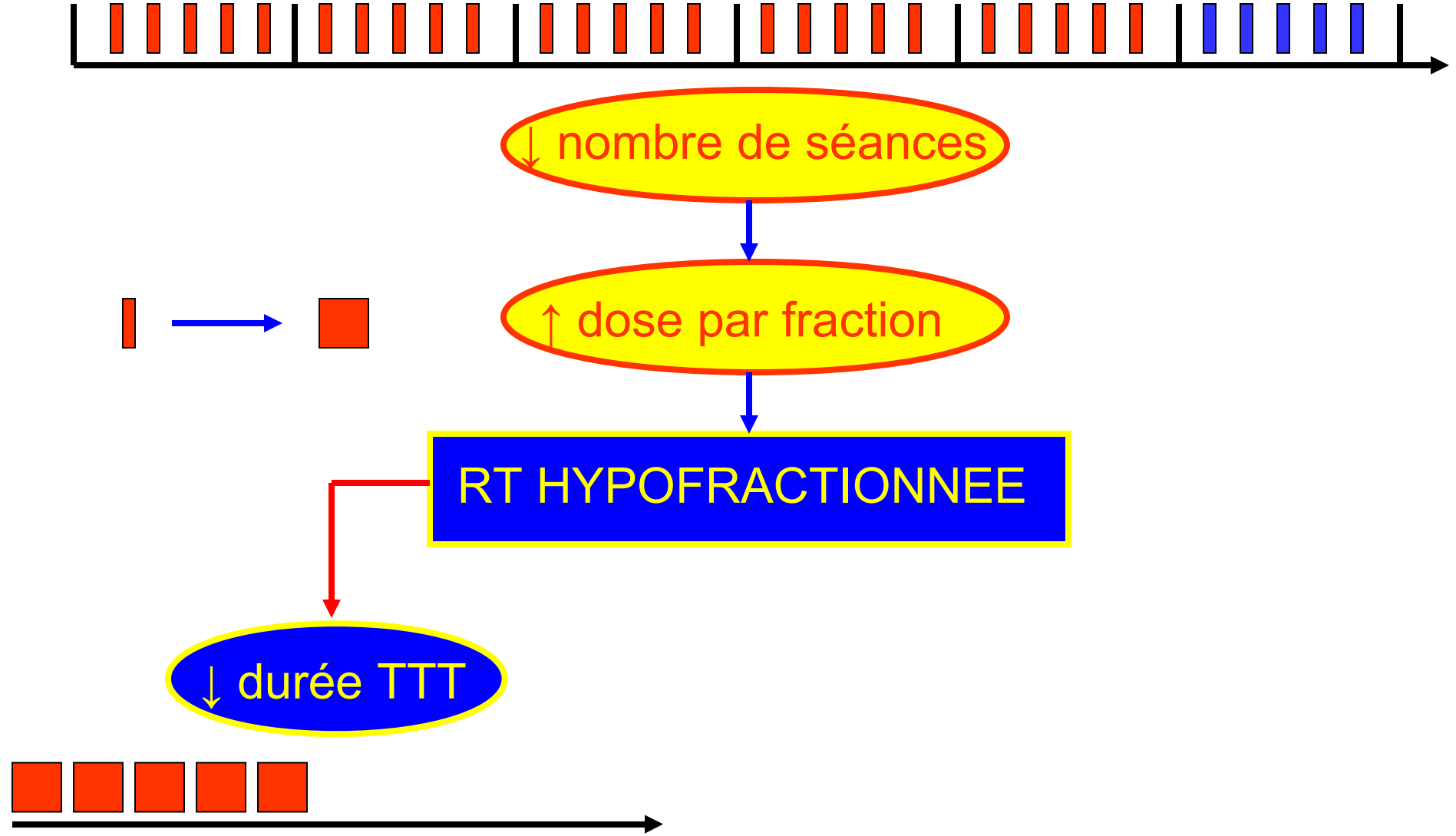

↓ nombre de séances
↑ dose par fraction

↓ nombre de séances



↑ dose par fraction

RT HYPOFRACTIONNEE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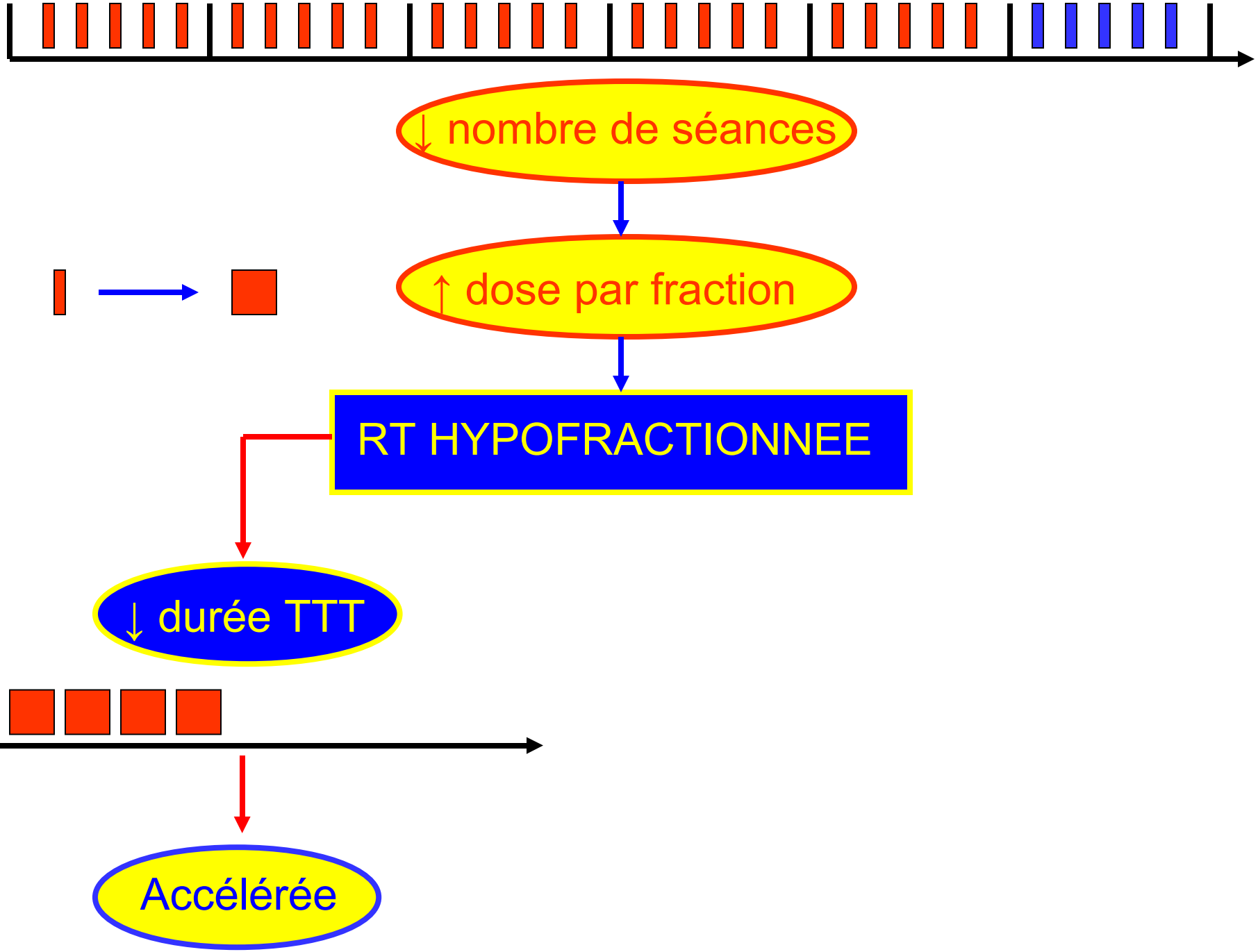
RT HYPOFRACTIONNEE
↓ durée TTT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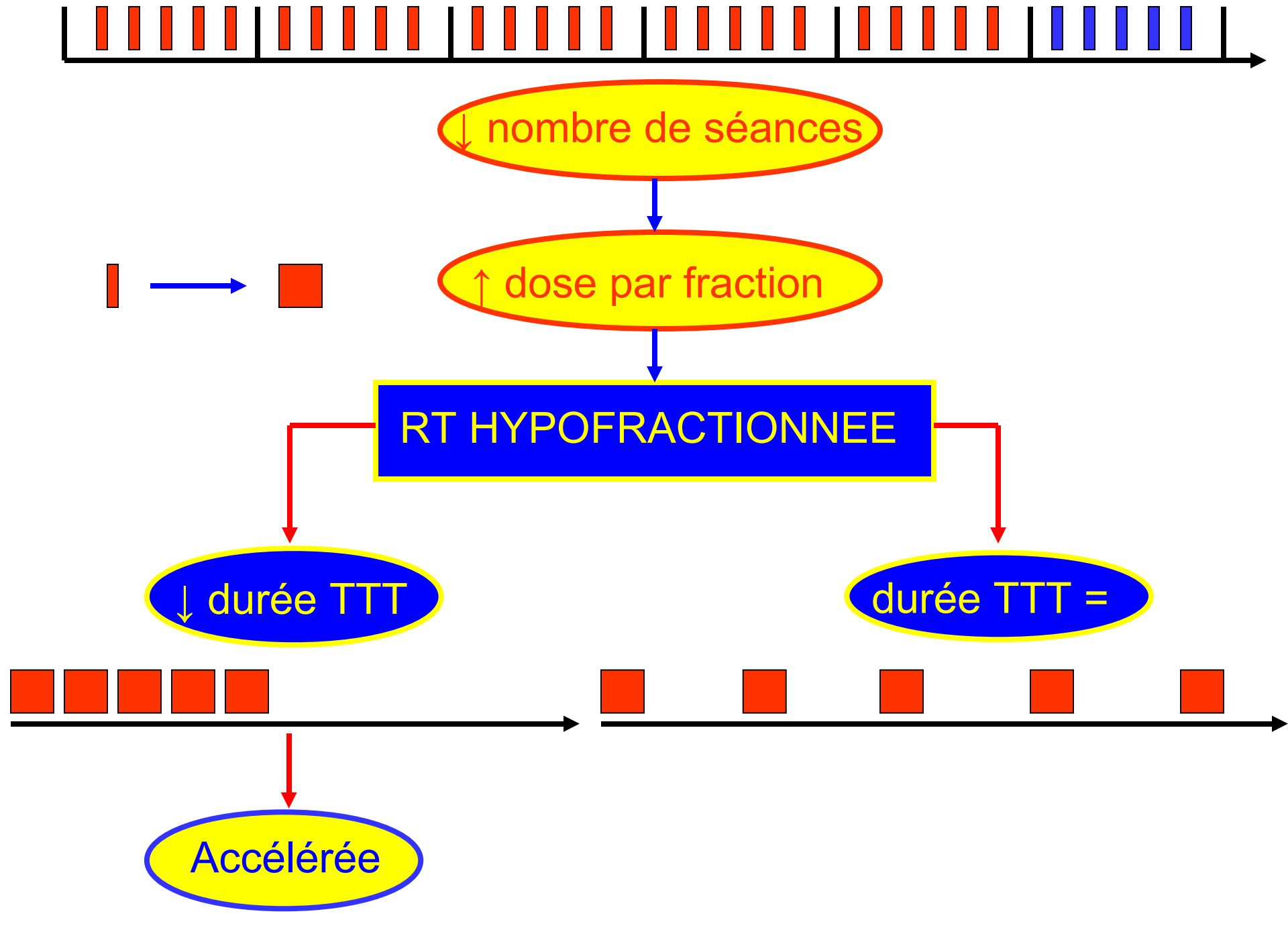
↑ dose par fraction
RT HYPOFRACTIONNEE
↓ durée TTT
Accélérée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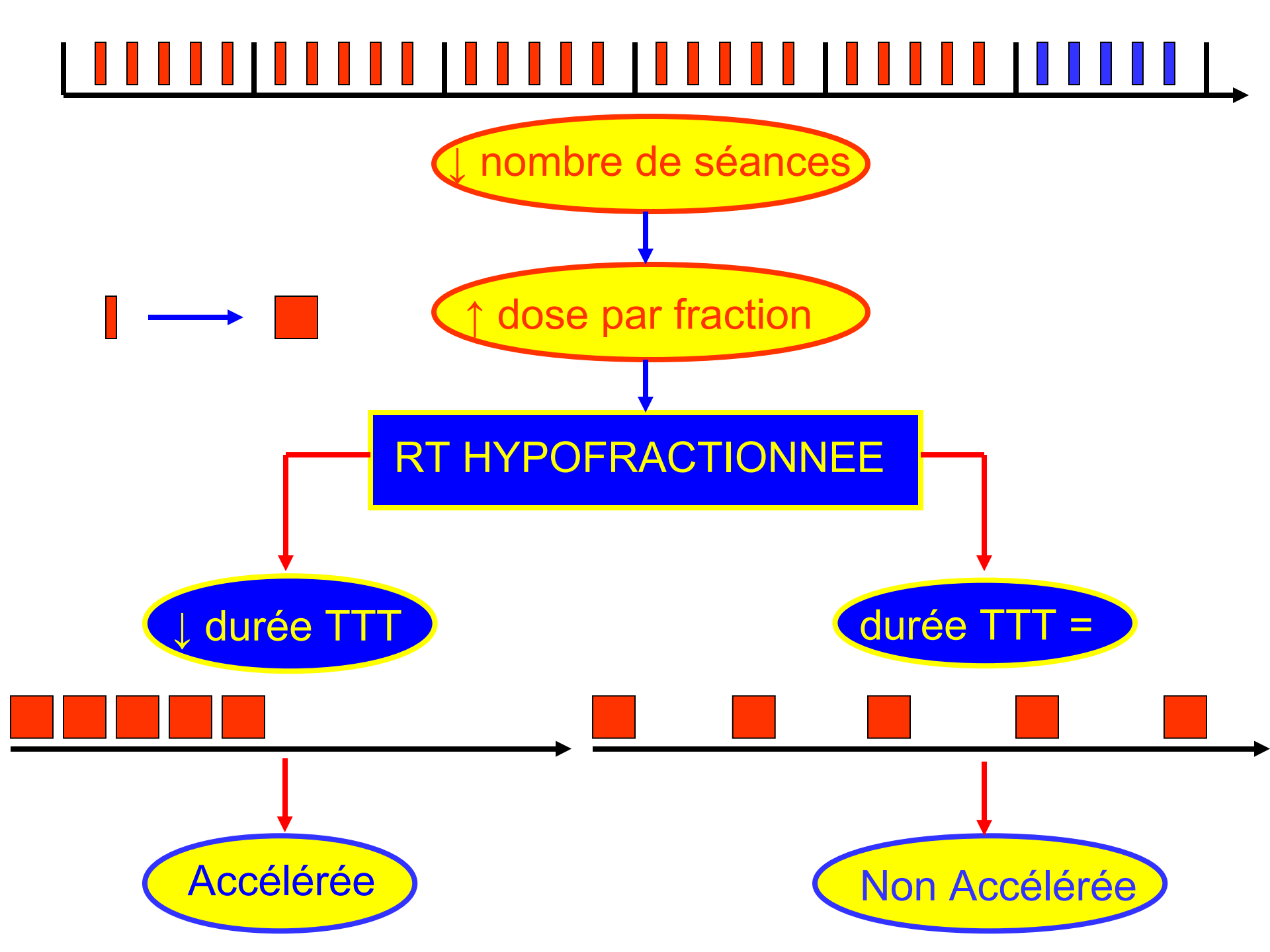
RT HYPOFRACTIONNEE
↓ durée TTT
durée TTT =
Accélérée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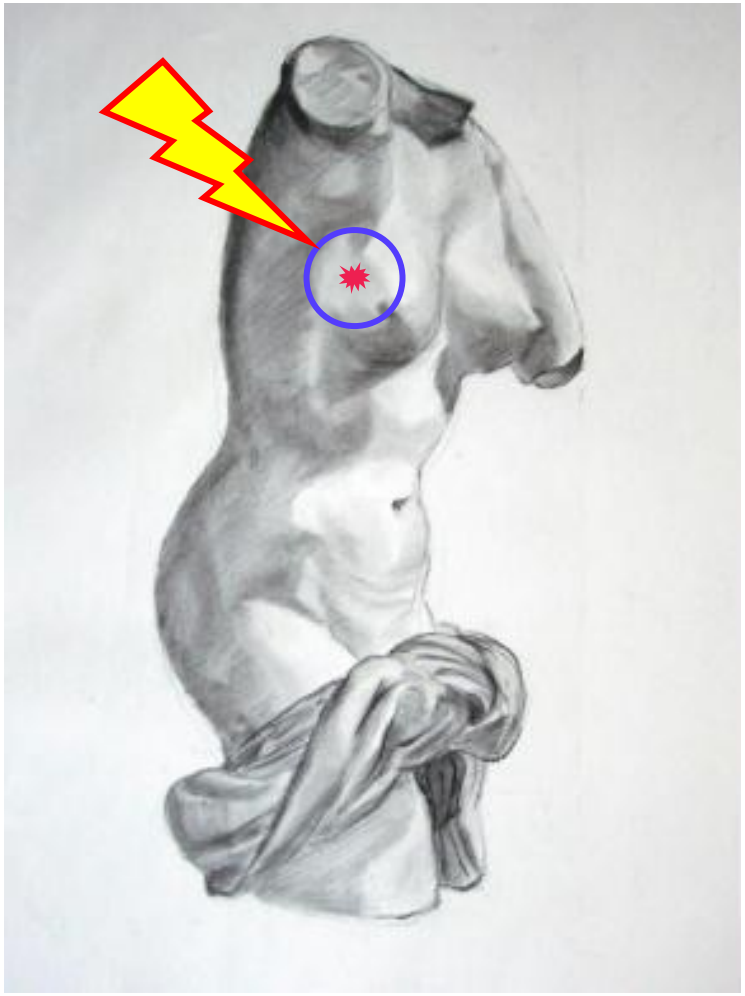
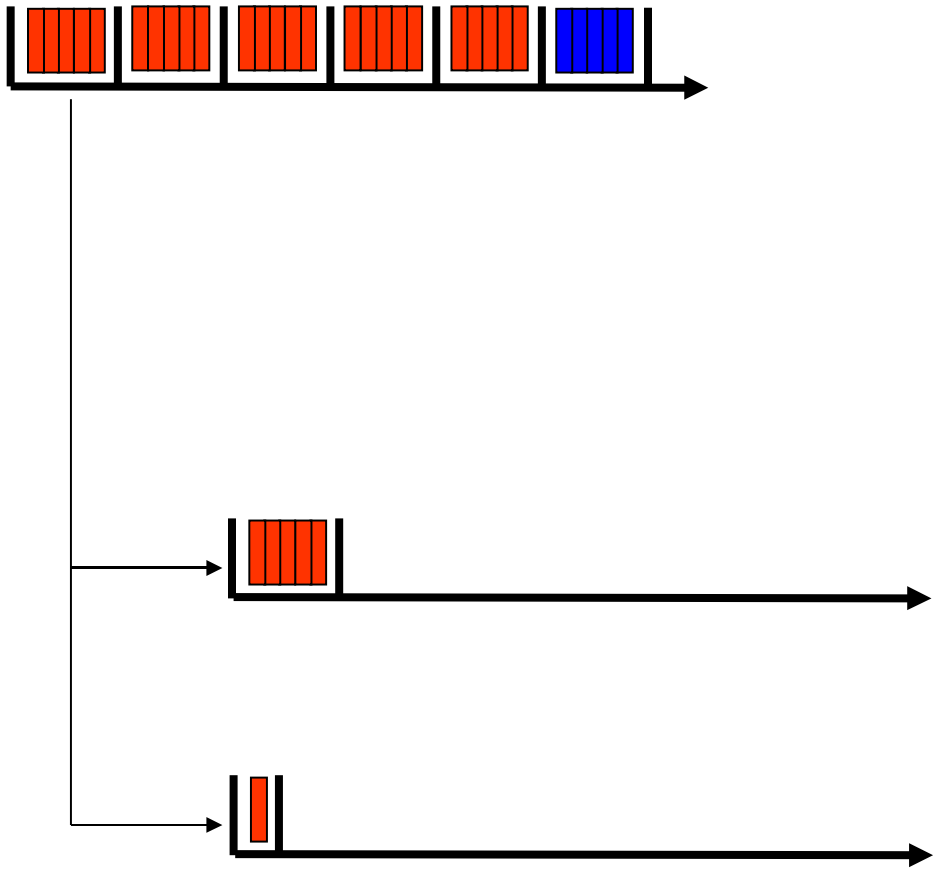
↑ dose par fraction
RT HYPOFRACTIONNEE
↓ durée TTT
durée TTT =
Accélérée
Non Accélérée

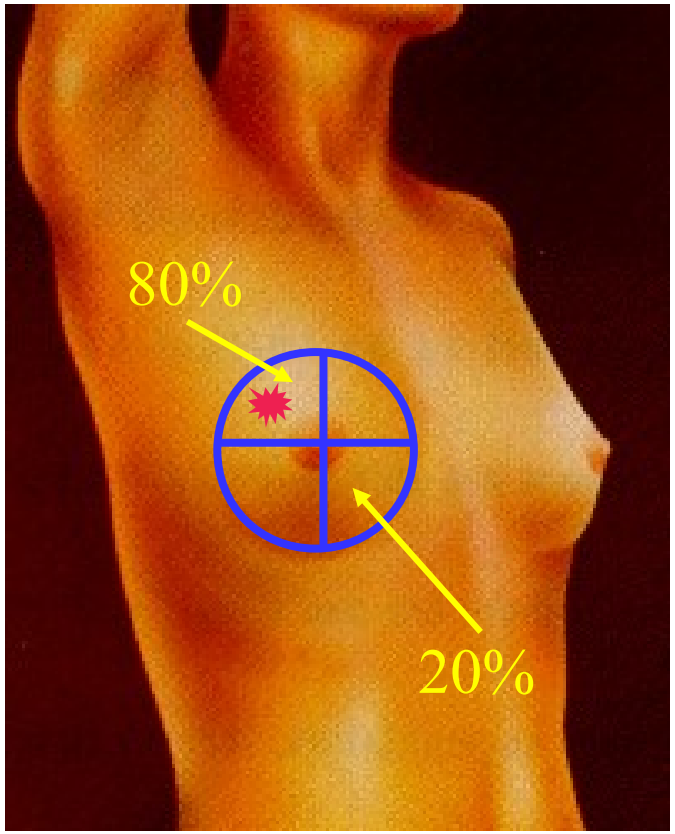




Rationnel

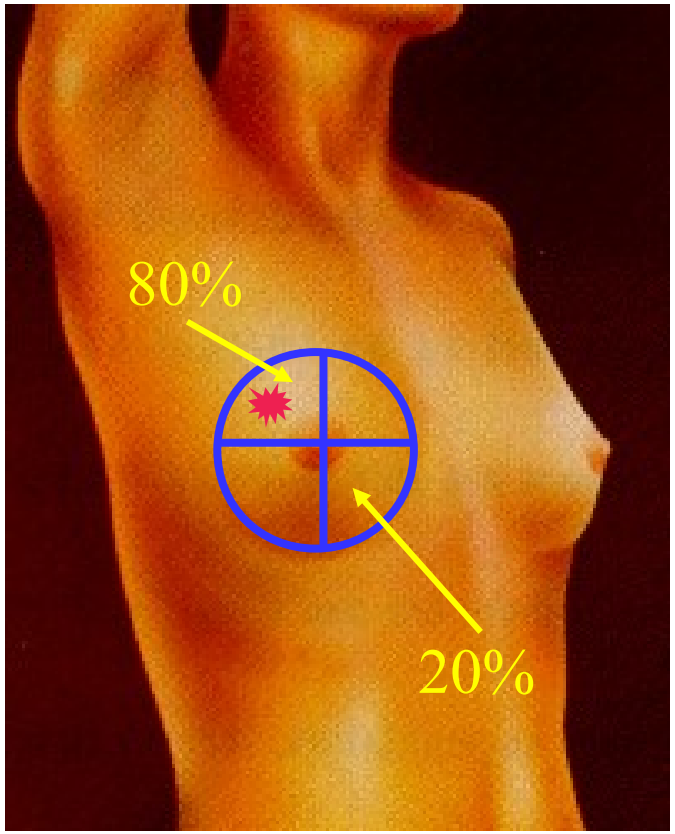
Rationnel

Clinique

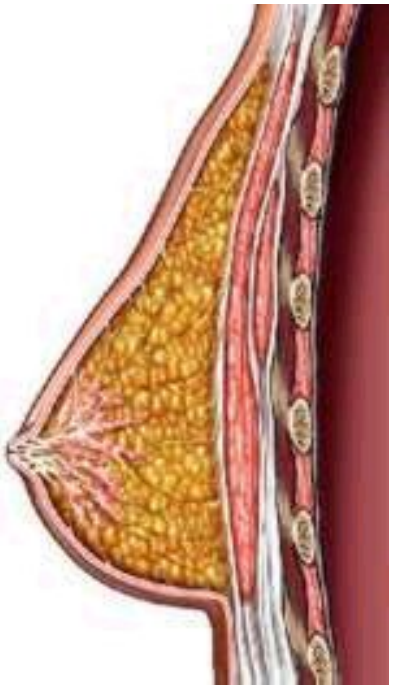


Rationnel

Clinique



Biologique



$$3 < \alpha/\beta < 5$$

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Histoire de l'IPAS

Ribeiro

1982

Histoire de l'IPAS

Cionini

Ribeiro

1982 1993

Histoire de l'IPAS

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Cionini

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Vicini

Polgar

1995

Histoire de l'IPAS

Ribeiro

1982

Cionini

1993

Vicini Polgar

1995

Vicini

2001

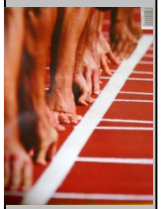
Histoire de l'IPAS

Ribeiro

Cionini

Vicini **Polgar**

Vicini



Phase II

Guy's
Hungarian
Christie Hospital
Guy's
Ontario
YBCG
Hungarian
Tufts
Osaka
Czech Republic
NIC Hungary
RTOG 9517
Beaumont Interstitial
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Beaumont MammoSite
Ochsner
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Colorado
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RTOG 0319
Rush
St. Vincent
Harvard 3D
Loma Linda
TARGIT

1982 1993 1995 2001 2000s

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Ribeiro — 1982

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Phase II — 2000s

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Phase III — 2003

Eliot
Targit
Gec-Estro
NSABP
Import
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2004

JNCI Betesda Workshop

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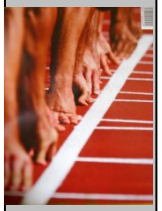

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JNCI Betesda Workshop — 2004

Consensus — 2009

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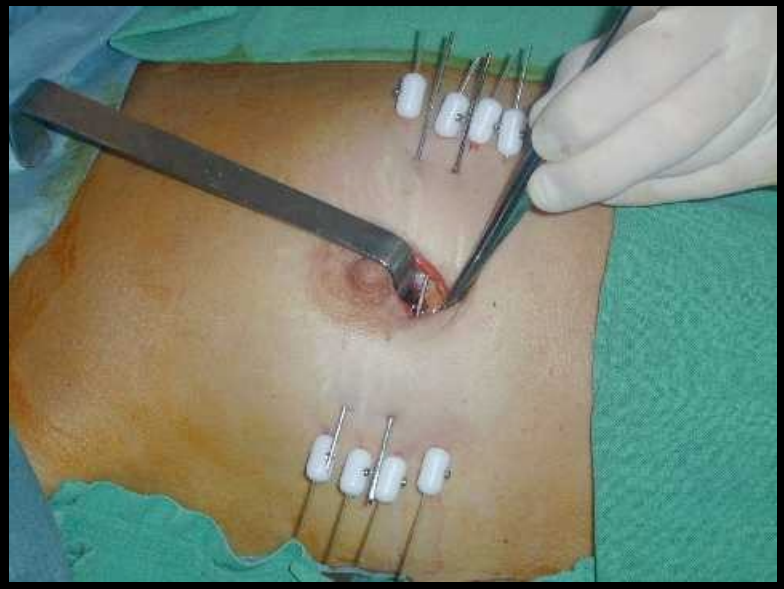

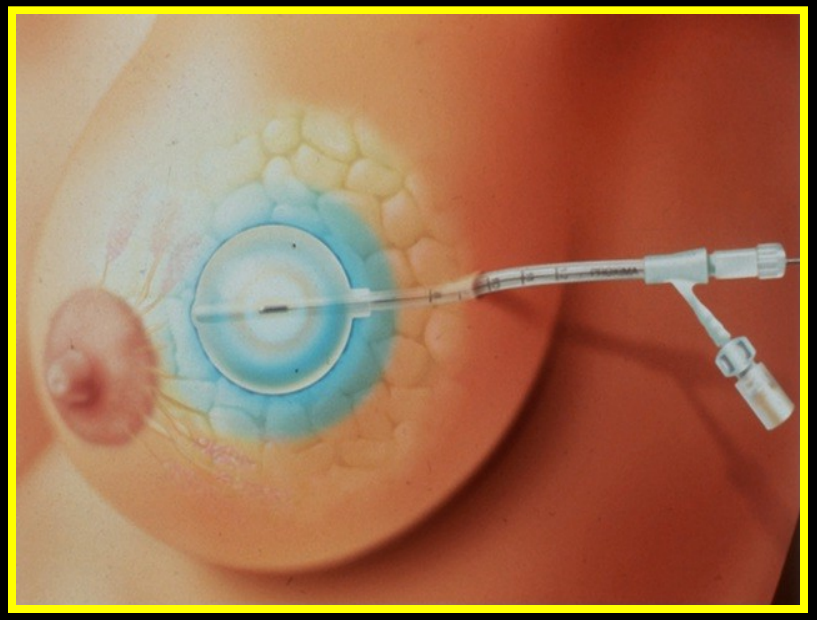

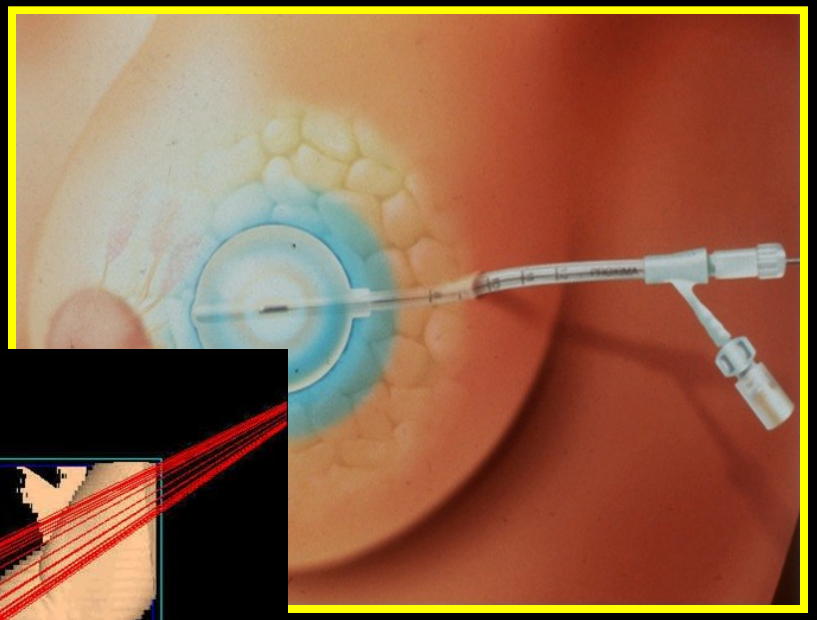

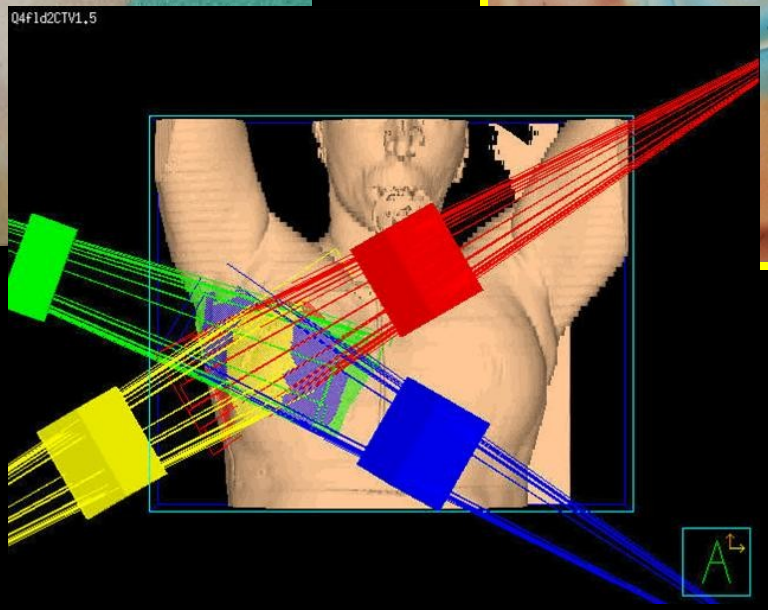
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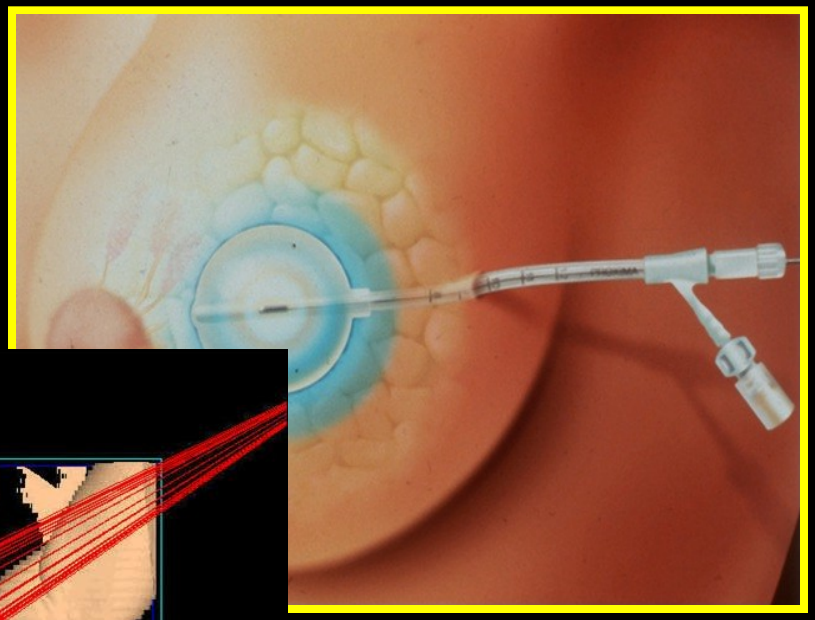

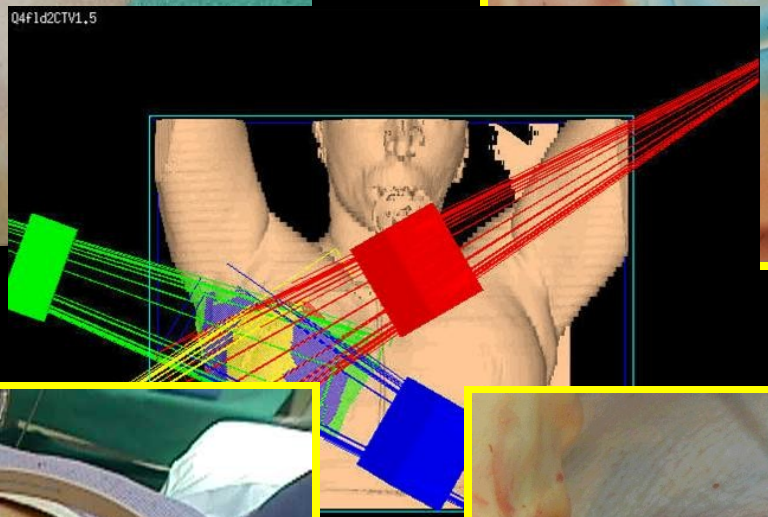
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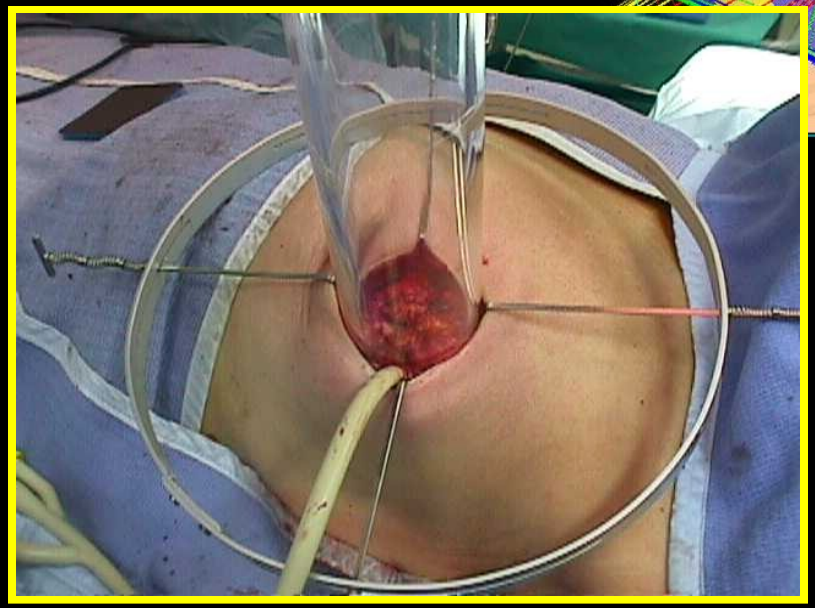
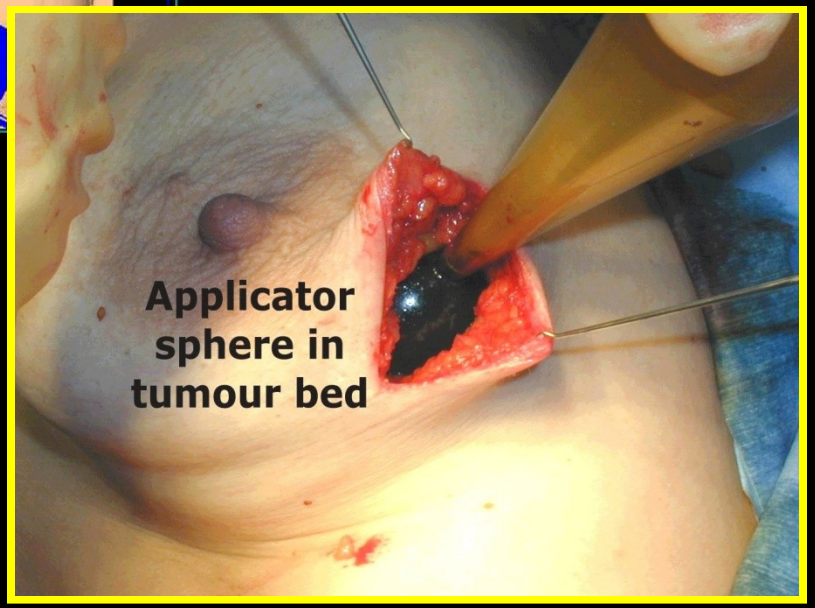
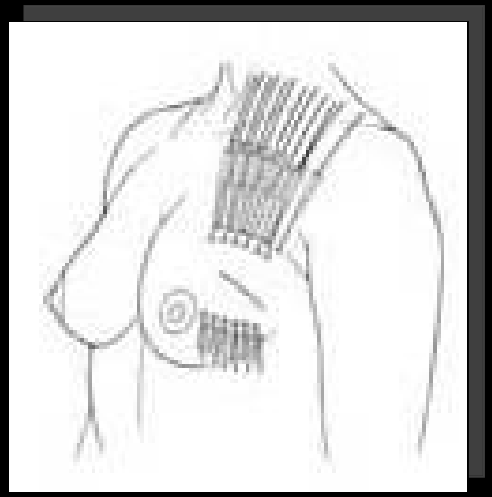
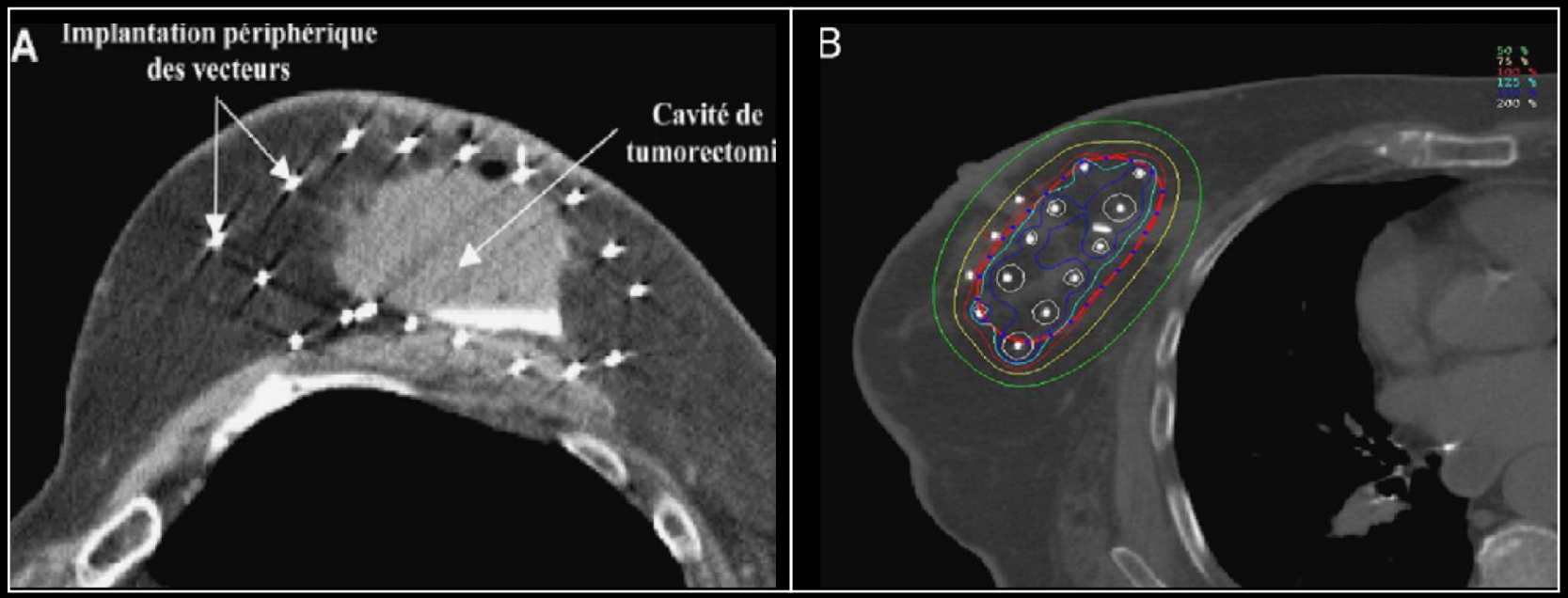


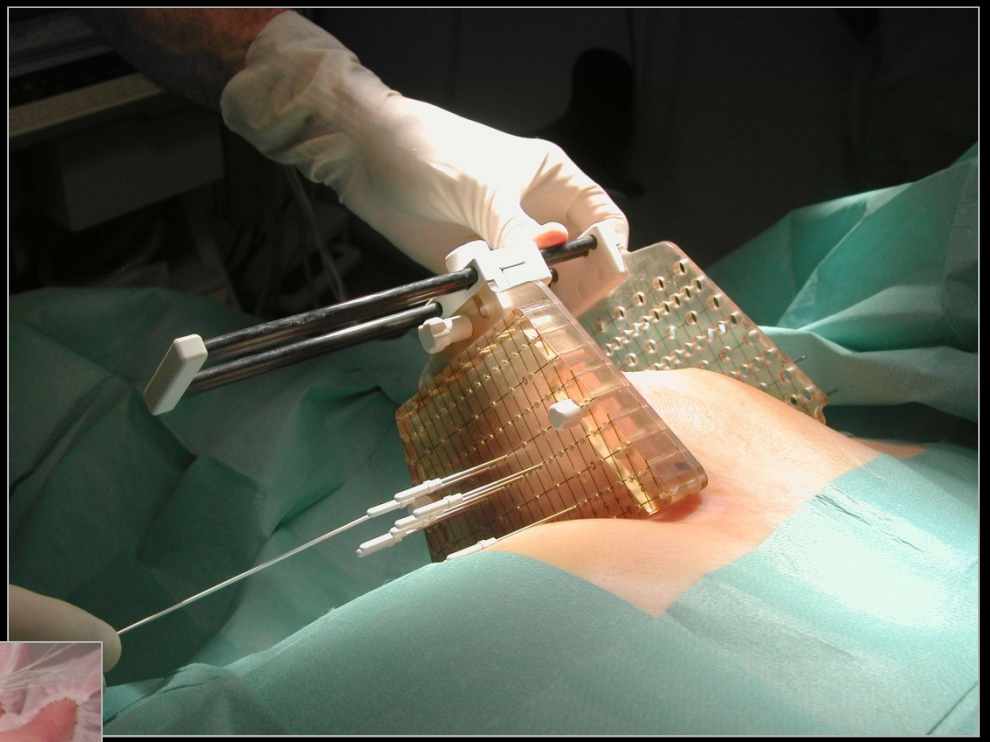

Applicator
sphere in
tumour bed

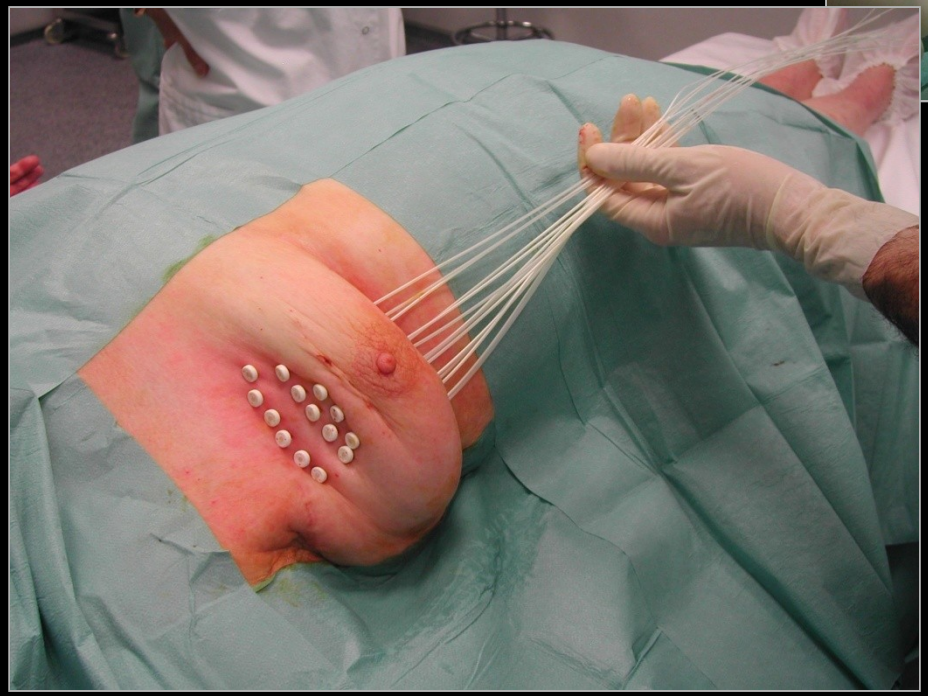


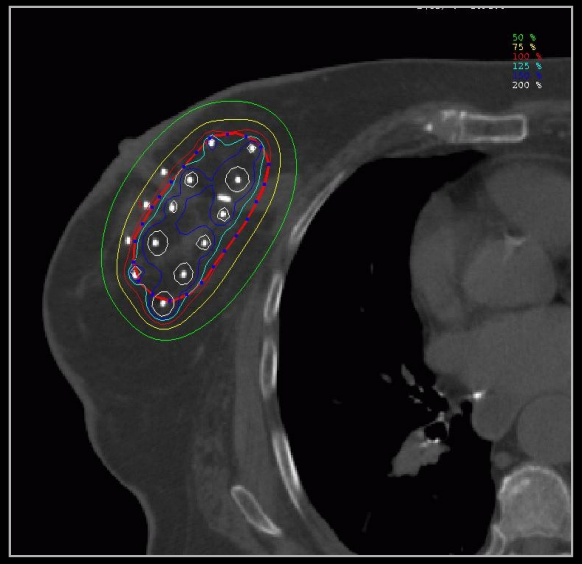


US UE

Hannoun-Levi JM et al. Cancer Radiother. 2008;12:532–540



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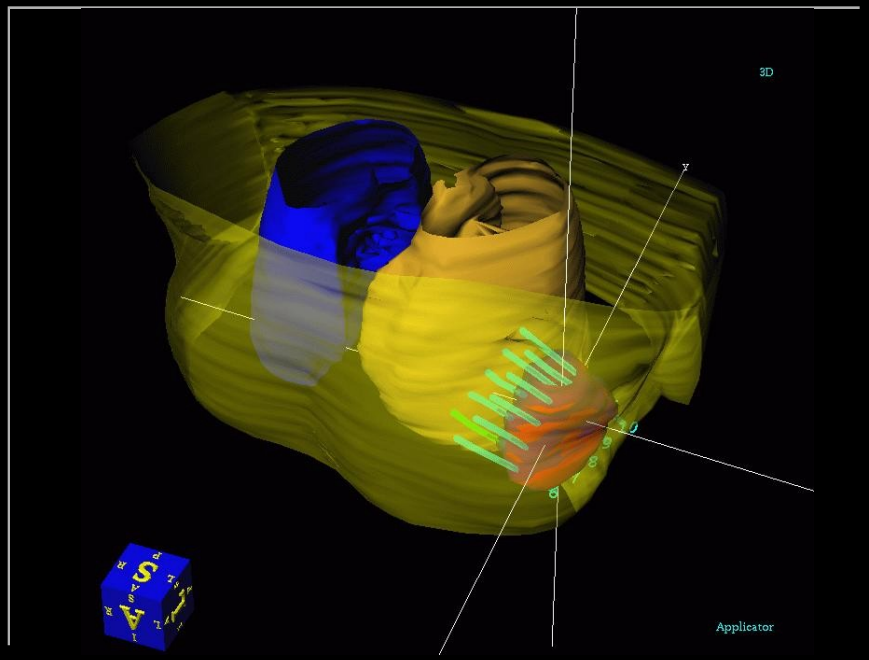
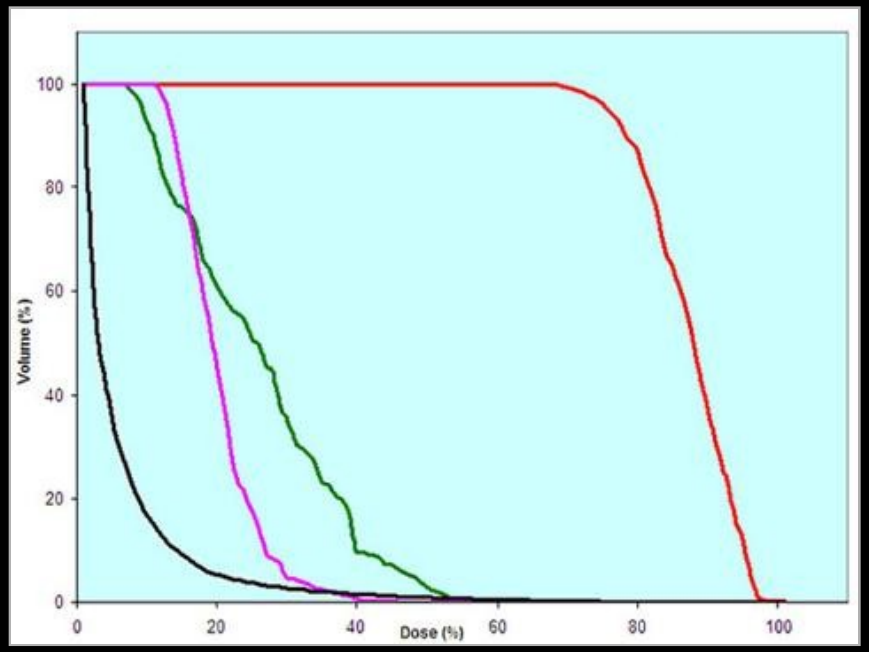
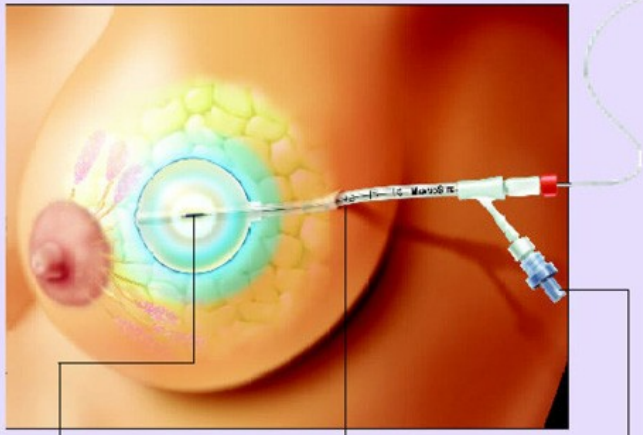
75 %
100 %
125 %
200 %


3D
Y
Applicator


100
80
60
40
20
0
Volume (%)
0
20
40
60
80
100
Dose (%)

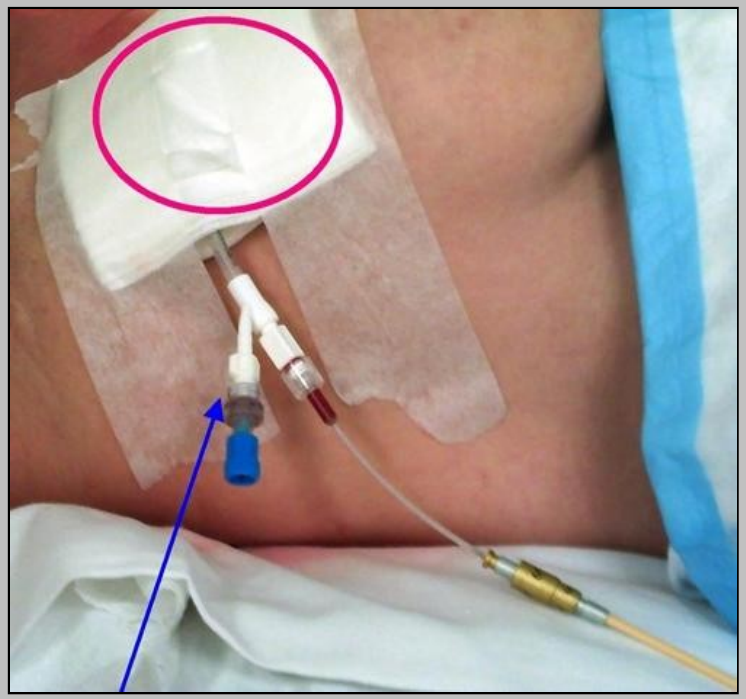


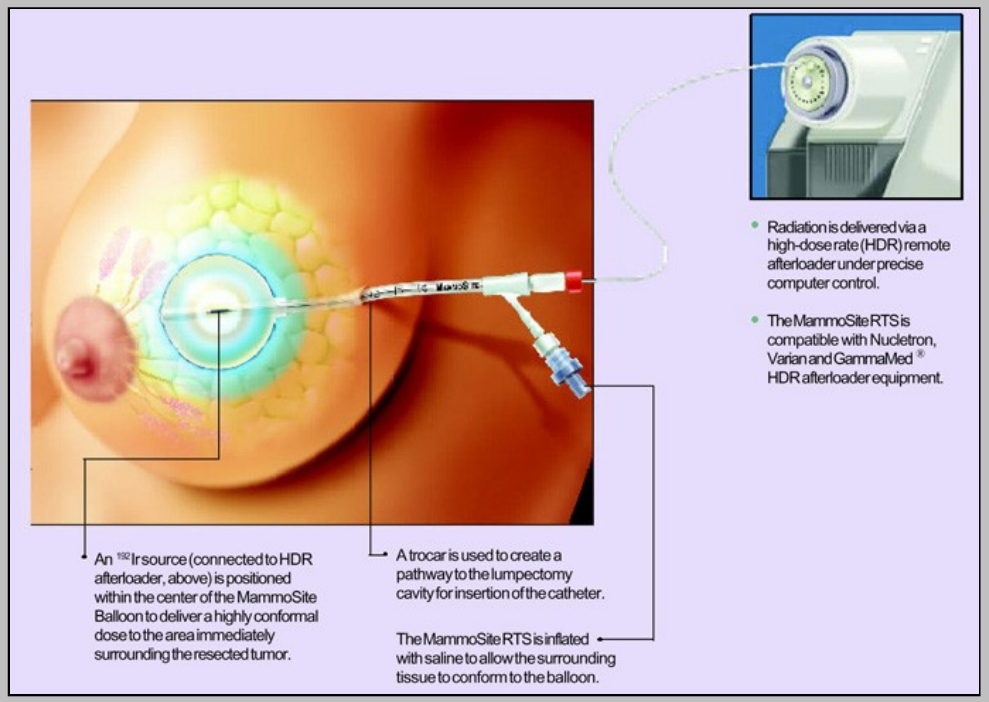
- Radiation is delivered via a high-dose rate (HDR) remote afterloader under precise computer control.
- The MammoSite RTS is compatible with Nucletron, Varian and GammaMed ® HDR afterloader equipment.

An ^{192}Ir source (connected to HDR afterloader, above) is positioned within the center of the MammoSite Balloon to deliver a highly conformal dose to the area immediately surrounding the resected tumor.

A trocar is used to create a pathway to the lumpectomy cavity for insertion of the catheter.

The MammoSite RTS is inflated with saline to allow the surrounding tissue to conform to the balloon.

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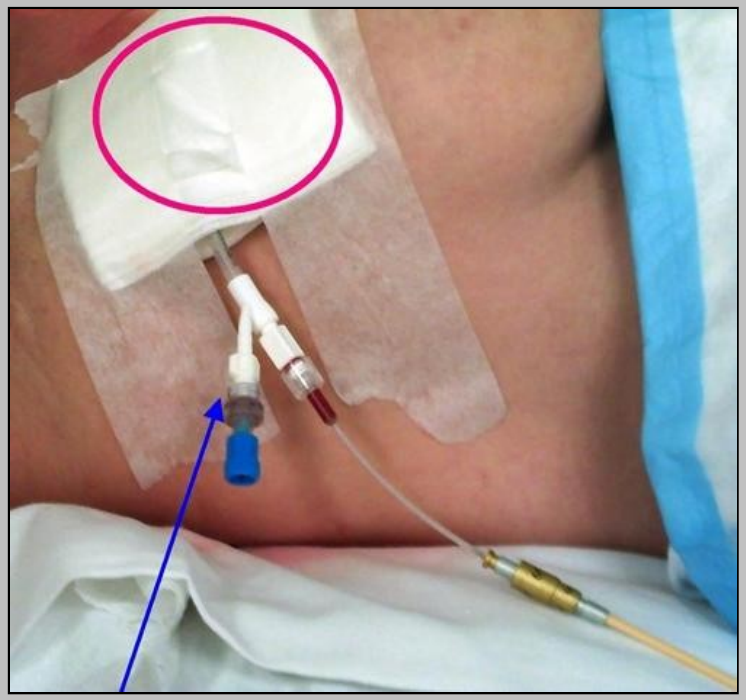
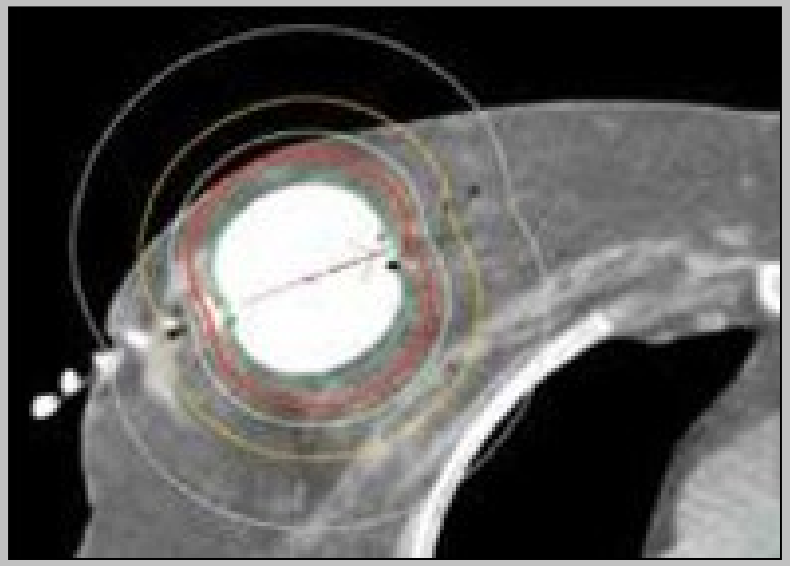
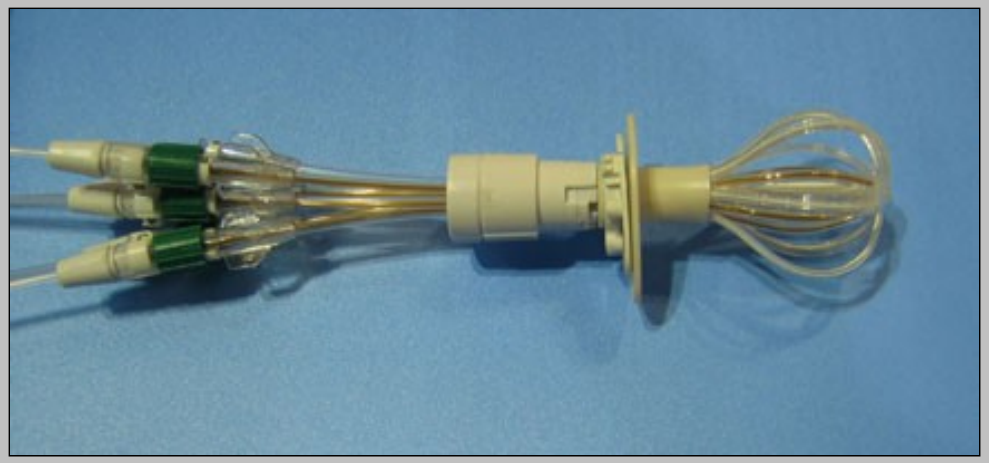
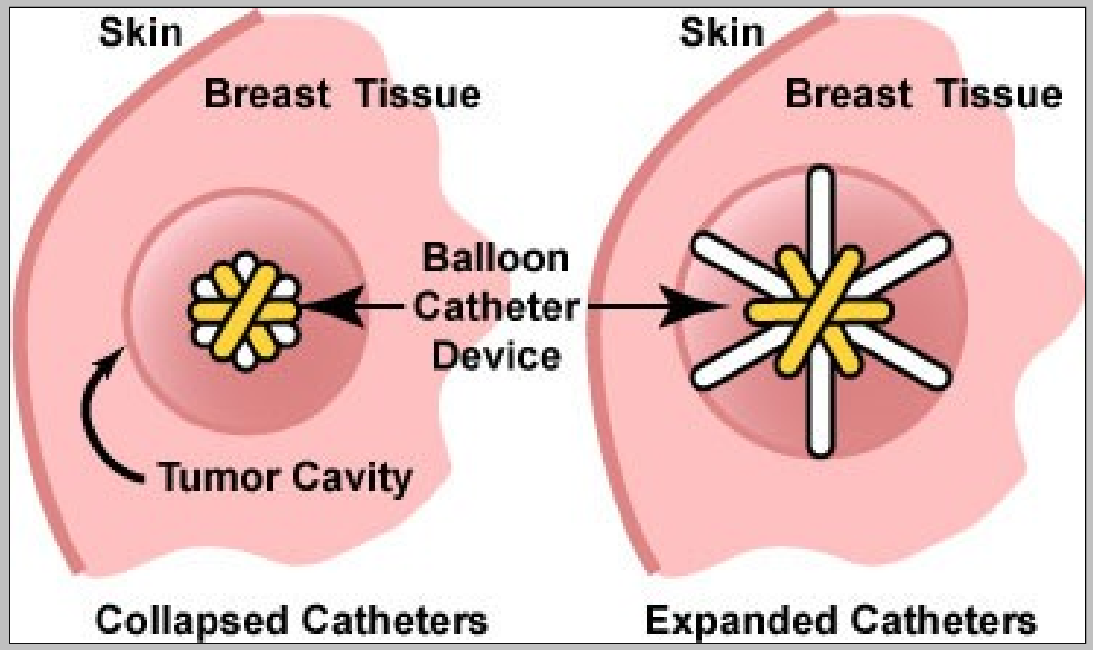
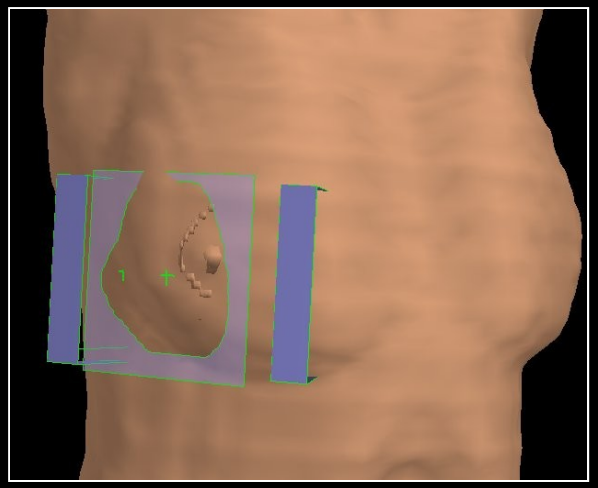
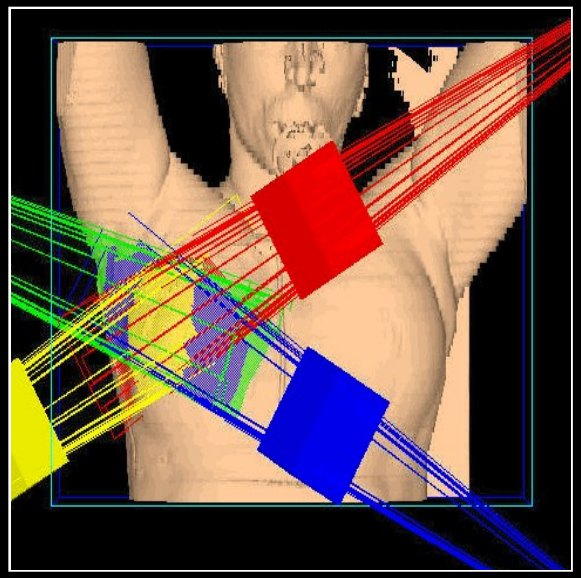


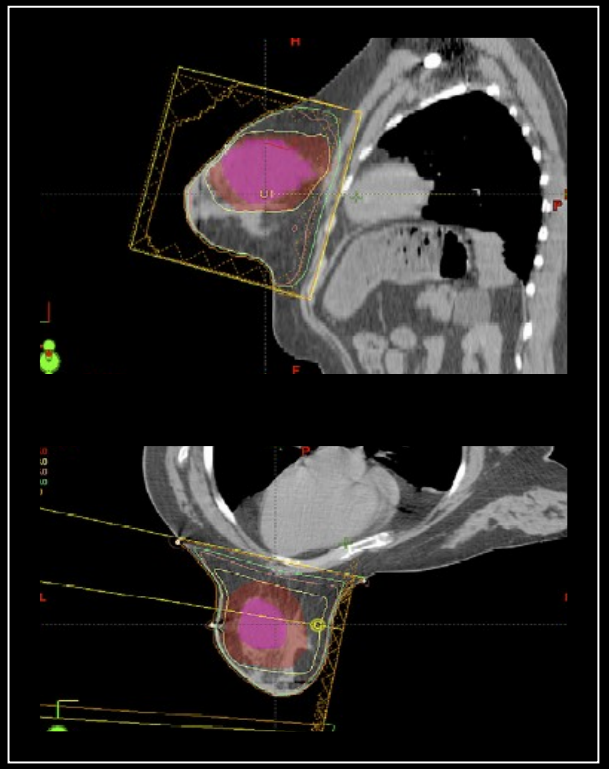


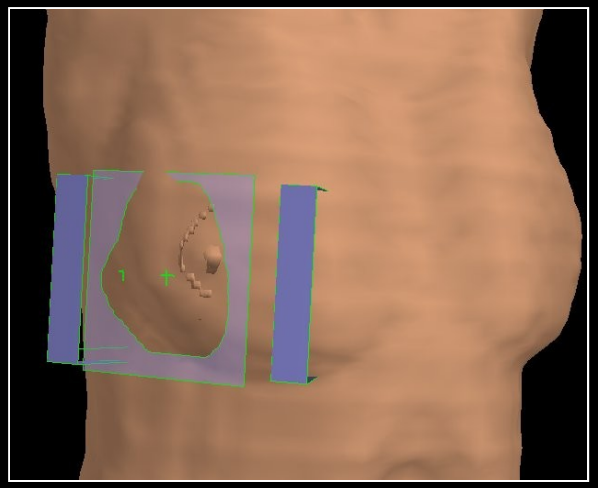


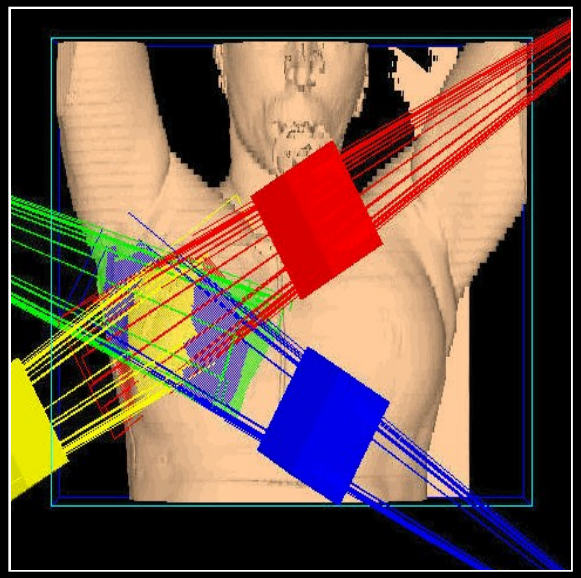

Skin
Breast Tissue
Balloon
Catheter
Device
Tumor Cavity
Collapsed Catheters
Skin
Breast Tissue
Expanded Catheters

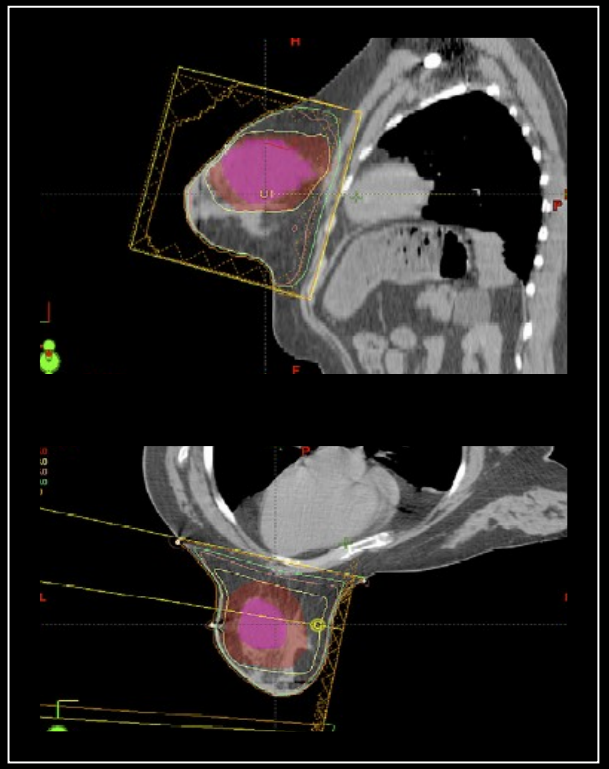


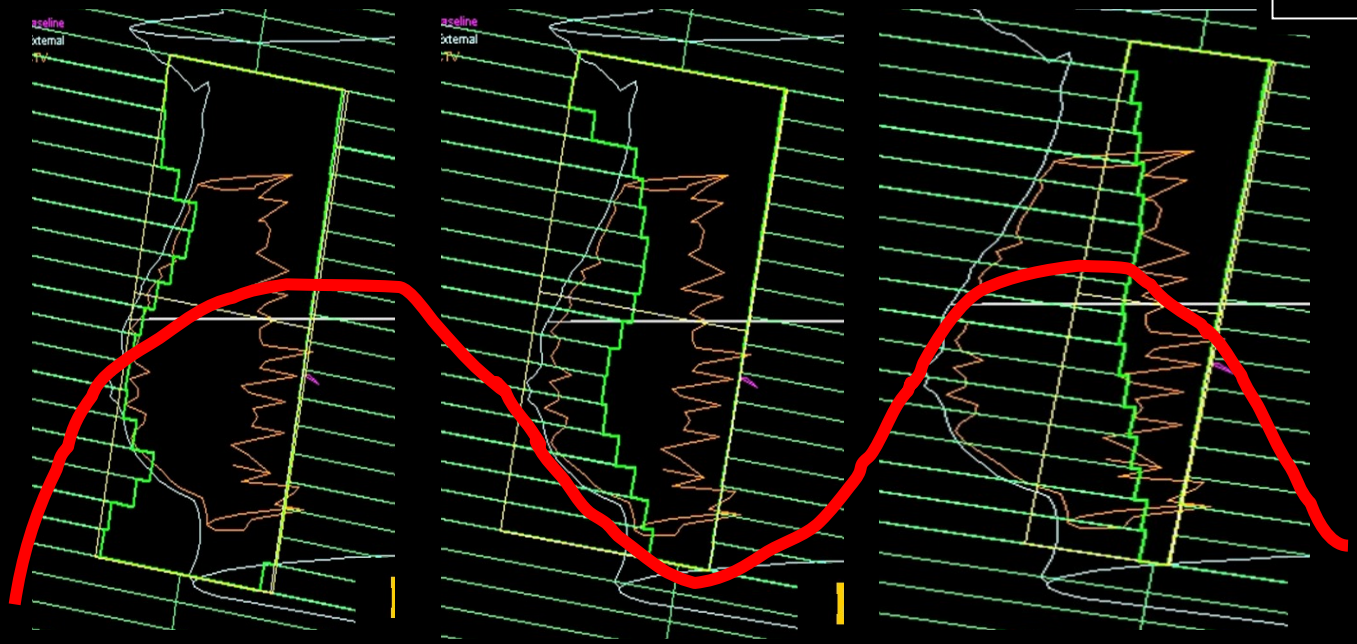


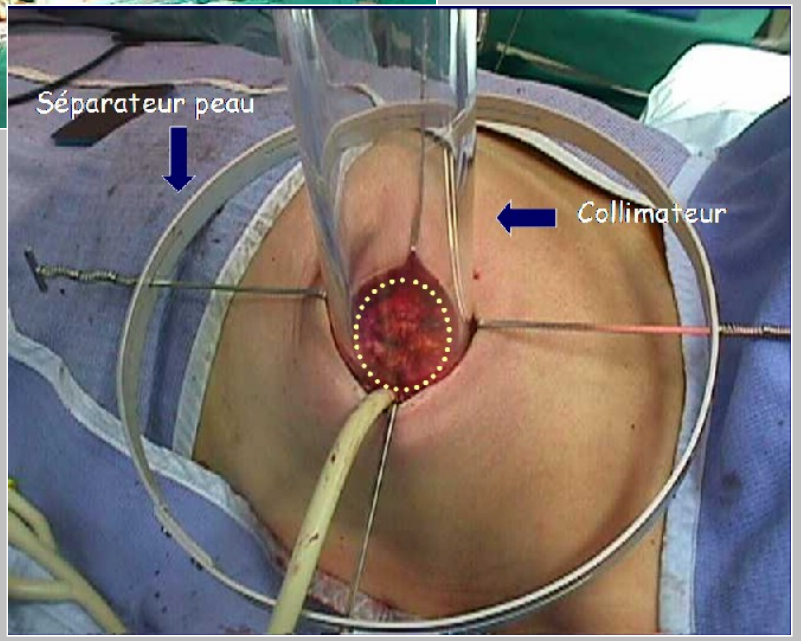




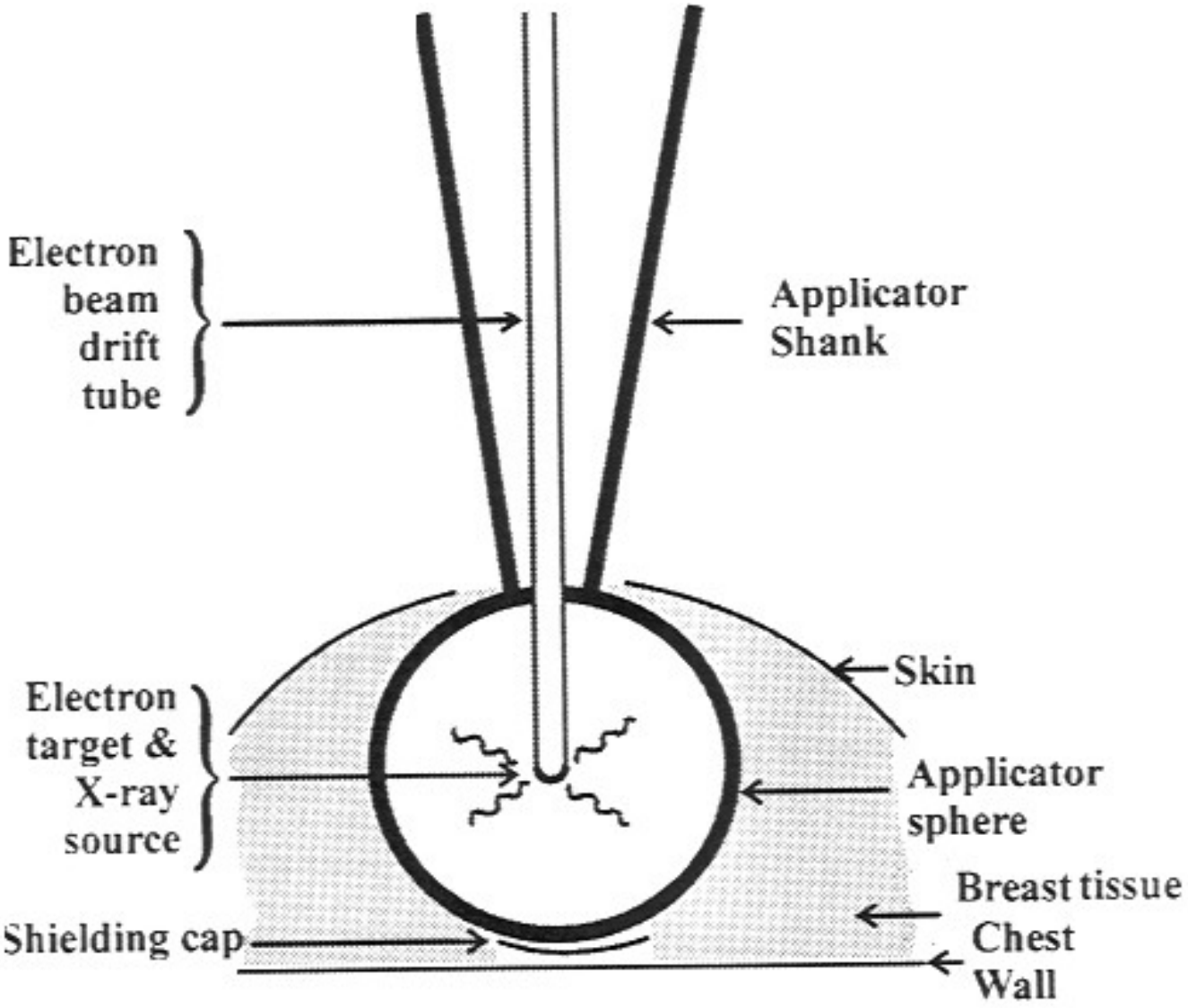


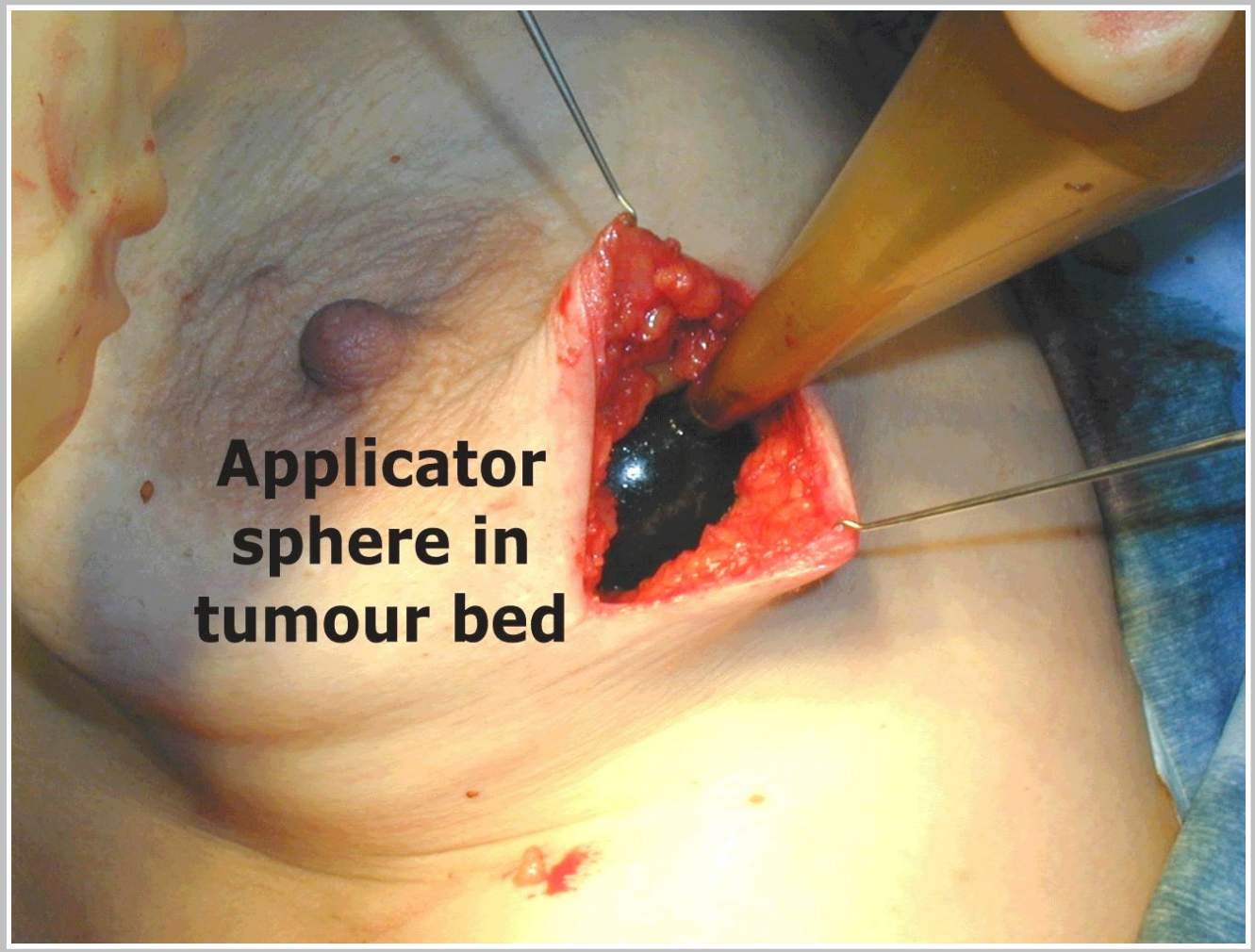





Séparateur peau
Collimateur


INTRABEAM

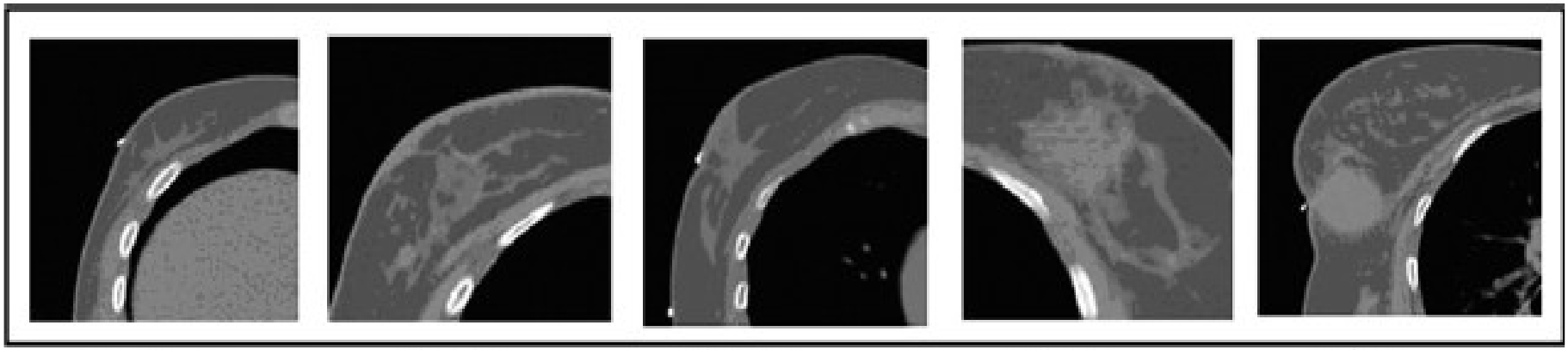

Electron beam drift tube
Applicator Shank
Skin
Electron target & X-ray source
Applicator sphere
Breast tissue
Shielding cap
Chest Wall


Applicator
sphere in
tumour bed

Détermination du volume cible

Détermination du volume cible

En fonction de la visualisation de la cavité de tumorectomie



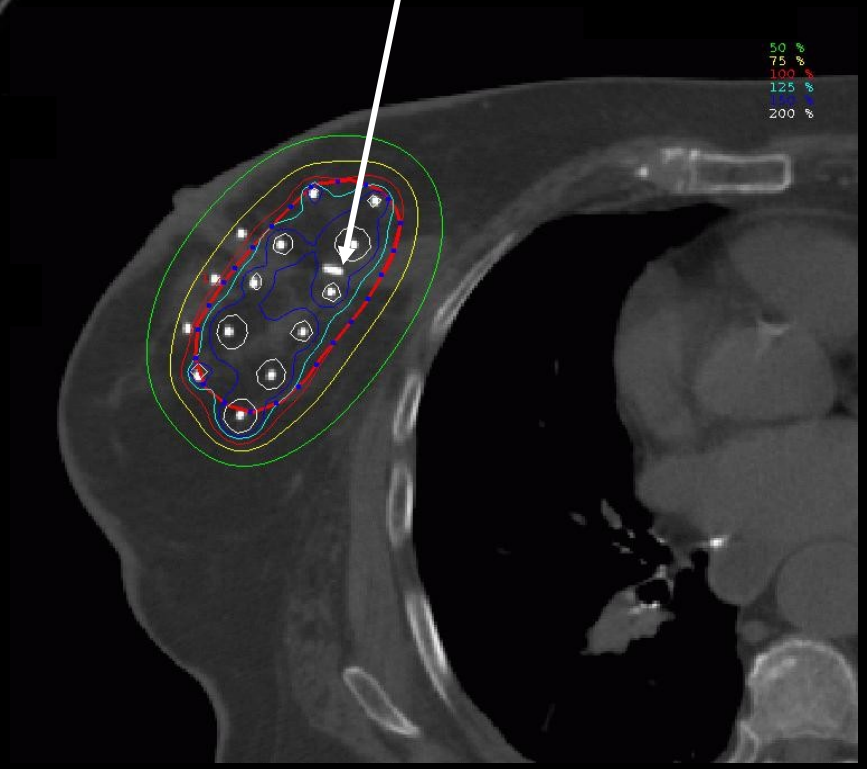
CVS 1	CVS 2	CVS 3	CVS 4	CVS 5
No Cavity	Heterogeneous cavity with indistinct margins	Heterogeneous cavity with some distinct margins	Mildly heterogeneous cavity with mostly distinct margins	Homogenous cavity with clearly identified margins

Cavity Visualization score

Landis D et al. IJROBP

IPAS post-op

Clips +++



En fonction de la visualisation de clips mis en per-opératoire

Développement

- Rationnel
- Historique
- Techniques
- Essais de phase III randomisés
- Consensus
- Perspectives

Techniques d'irradiation partielle et accélérée du sein et critères d'inclusion utilisés dans les essais randomisés comparant IPAS et ITS

	Origine	Techniques	Dose/fraction (Gy)	Dose totale (Gy)
Eliot [18]	Milan	IO électrons	21	21
Targit [17]	Londres	IO photons 50	20	20
Gec-Estro [6]	Union européenne	Curie HDD BDD	3,4	34 HDD, 50 BDP
NSABP/RTOG [20]	États-Unis	RC3D Curie MMS	RT 3,85 ; Curie 3,4	RT 38,5, Curie 34
Import [3]	Royaume-Uni	RC3D MI		
Rapid [2]	Canada	RC3D	3,85	38,5

Hannoun-Levi JM et al. Cancer Radiother. 2008;12:374–379

Techniques d'irradiation partielle et accélérée du sein et critères d'inclusion utilisés dans les essais randomisés comparant IPAS et ITS

	Origine	Techniques	Dose/fraction (Gy)	Dose totale (Gy)
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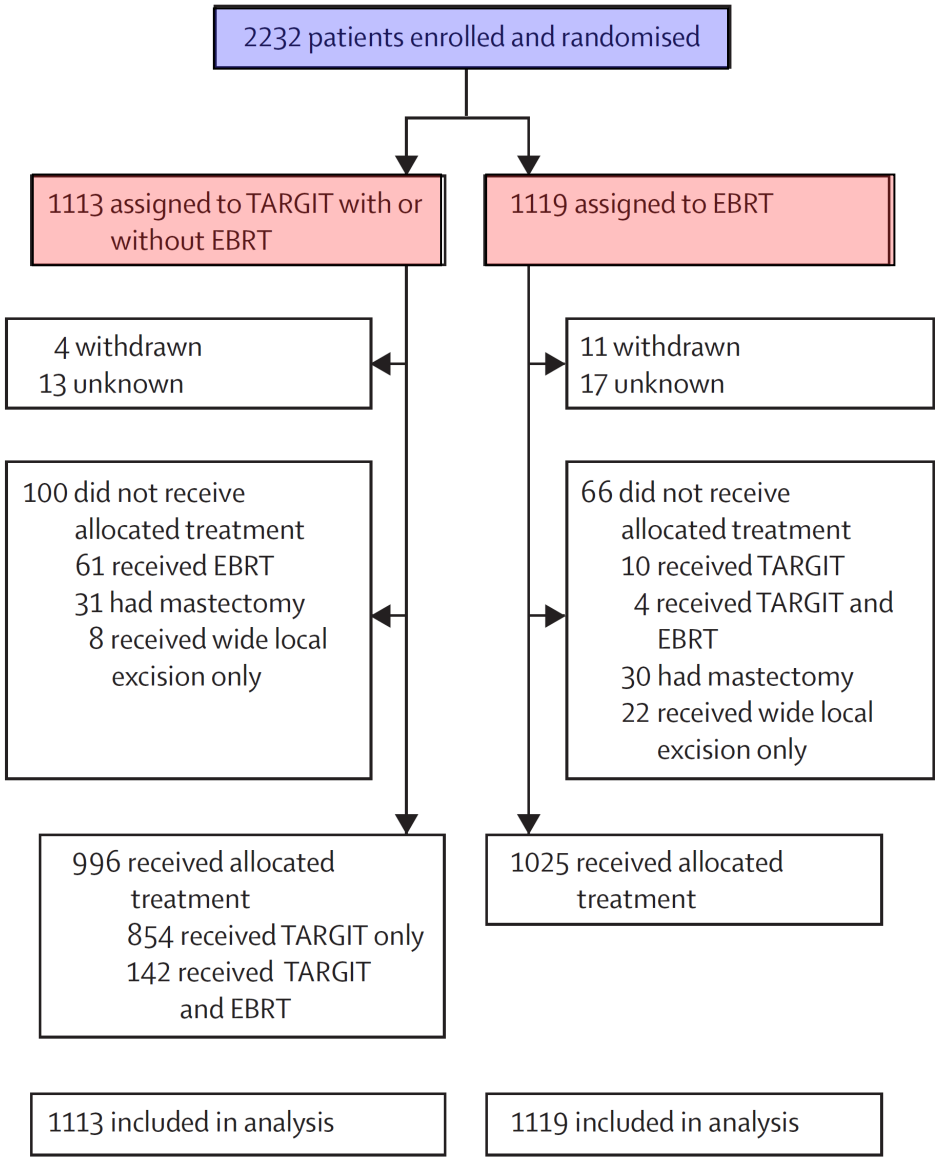
Gec-Estro [6]	Union européenne	Curie HDD BDD	3,4	34 HDD, 50 BDP
NSABP/RTOG [20]	États-Unis	RC3D Curie MMS	RT 3,85 ; Curie 3,4	RT 38,5, Curie 34
Import [3]	Royaume-Uni	RC3D MI		
Rapid [2]	Canada	RC3D	3,85	38,5

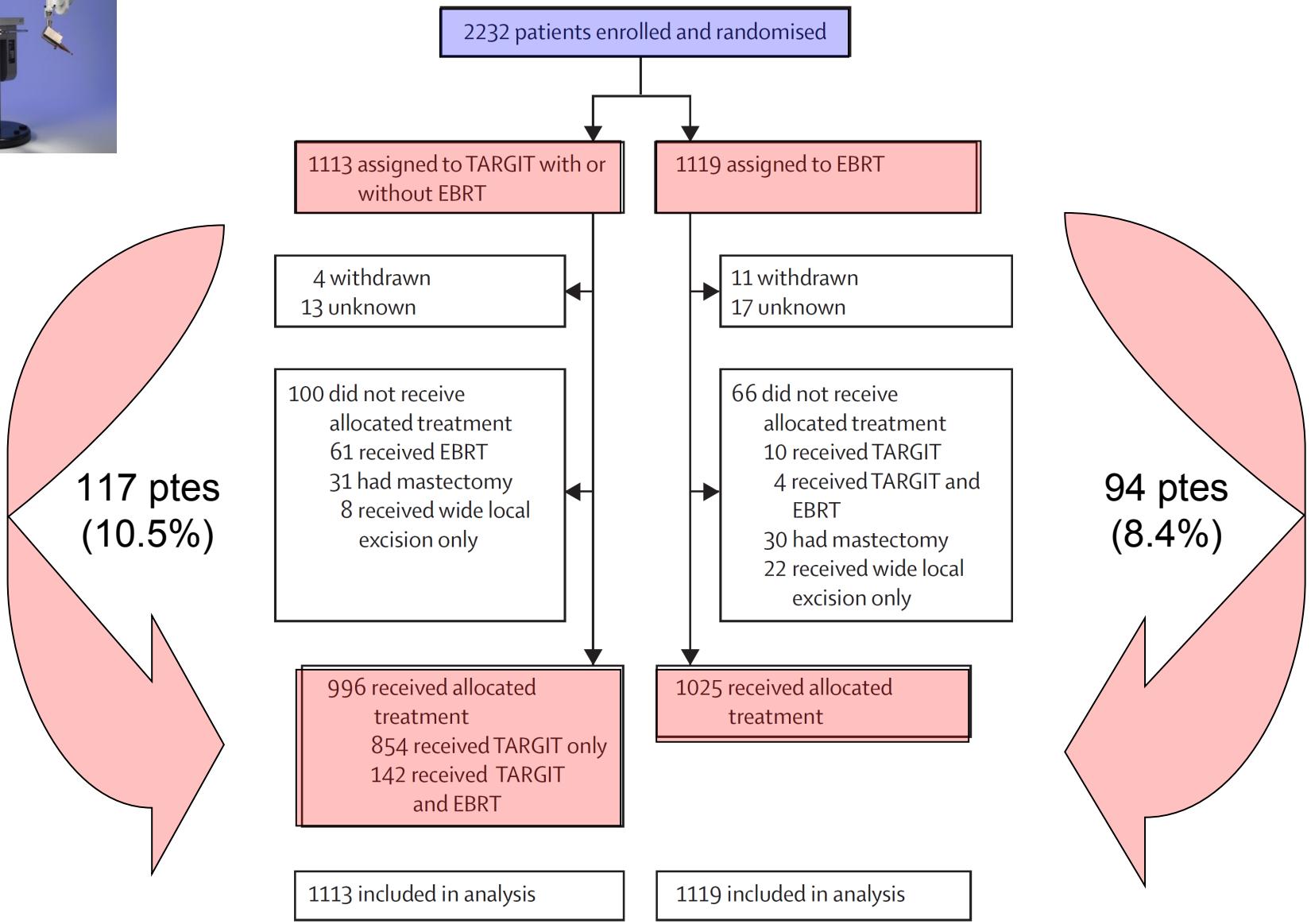
	# ptes	Date activation	Âge	T. tum. (mm)	# N+	Grade histo.	Lim. résec. (mm)
Eliot [18]	1200	11/2000	> 48	< 25	0	I–III	> 10
Targit [17]	2232	03/2000	> 40	< 30	0	I–III	Négative
Gec-Estro [6]	1170	05/2004	> 40	< 30	0 ou 1 μmet	I–III	> 2 inv., > 5 i.s.
NSABP/RTOG [20]	3000	03/2005	> 18	< 30	Jusqu'à 3	I–III	Négative
Import [3]	1935	09/2006	> 50	< 20	0	I et II	> 2
Rapid [2]	2128	02/2006	> 40	< 30	0	I–III	Négative

Hannoun-Levi JM et al. Cancer Radiother. 2008;12:374–379

Targeted Intraoperative Radiotherapy (TARGIT-A trial)



Vaidya JS et al. Lancet 2010;376:91–102



Vaidya JS et al. Lancet 2010;376:91–102

2232 patients enrolled and randomised

1113 assigned to TARGIT with or without EBRT

1119 assigned to EBRT

4 withdrawn
13 unknown

11 withdrawn
17 unknown

100 did not receive allocated treatment
61 received EBRT
31 had mastectomy
8 received wide local excision only

66 did not receive allocated treatment
10 received TARGIT
4 received TARGIT and EBRT
30 had mastectomy
22 received wide local excision only

117 ptes (10.5%)

94 ptes (8.4%)

996 received allocated treatment
854 received TARGIT only
142 received TARGIT and EBRT

1025 received allocated treatment

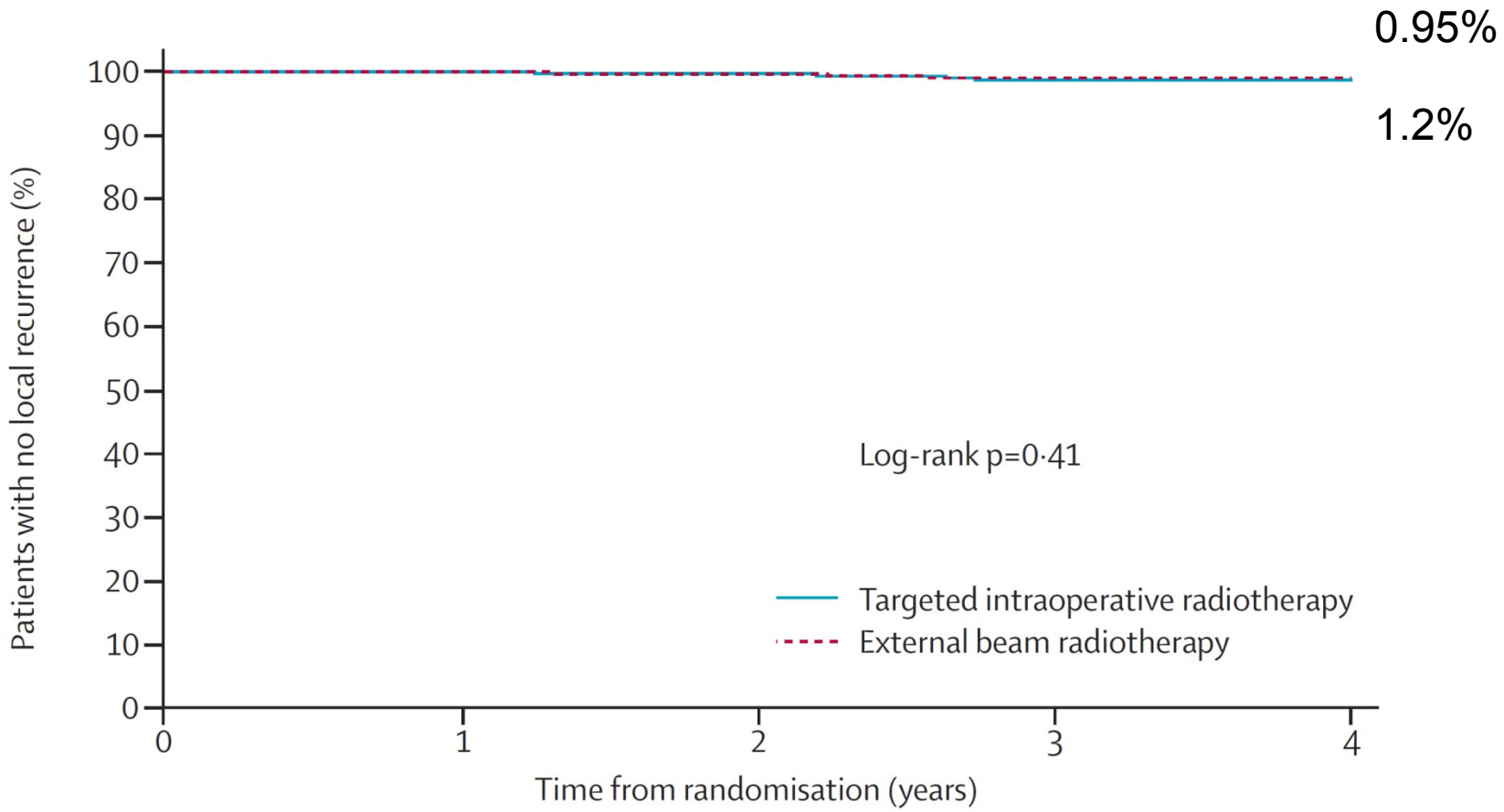
1113 included in analysis

1119 included in analysis

142 ptes (14.3%) (expected 15%)

Vaidya JS et al. Lancet 2010;376:91–102

Survie sans rechute locale à 4 ans



Vaidya JS et al. Lancet 2010;376:91–102

Comparaison du taux de récidive locale dans le sein traité et le sein controlatéral après IPAS

Comparaison du taux de récidive locale dans le sein traité et le sein controlatéral après IPAS

Auteurs		Freedman et al.
Techniques d'irradiation		ITS
# pts		1990
Suivi médian (années)		6.5
Tx RL à 5 ans (%)		
	VRL	2
	RLD	1
	RCL	3
Tx RL à 10 ans (%)		
	VRL	5
	RLD	2
	RCL	7
Tx RL à 15 ans (%)		
	VRL	7
	RLD	6
	RCL	13

Hannoun-Levi JM et al. Cancer Radiother. 2010;14:176–182

Comparaison du taux de récidive locale dans le sein traité et le sein controlatéral après IPAS

Auteurs		Freedman et al.	Arthur et al.
Techniques d'irradiation		ITS	IPAS
# pts		1990	99
Suivi médian (années)		6.5	7
Tx RL à 5 ans (%)			
	VRL	2	3
	RLD	1	2
	RCL	3	3
Tx RL à 10 ans (%)			
	VRL	5	-
	RLD	2	-
	RCL	7	-
Tx RL à 15 ans (%)			
	VRL	7	-
	RLD	6	-
	RCL	13	-

Hannoun-Levi JM et al. Cancer Radiother. 2010;14:176–182

Comparaison du taux de récidive locale dans le sein traité et le sein controlatéral après IPAS

Auteurs		Freedman et al.	Arthur et al.	Antonucci et al.	
Techniques d'irradiation		ITS	IPAS	ITS	IPAS
# pts		1990	99	199	199
Suivi médian (années)		6.5	7	13.7	9.4
Tx RL à 5 ans (%)					
	VRL	2	3	1	0
	RLD	1	2	1	0
	RCL	3	3	-	-
Tx RL à 10 ans (%)					
	VRL	5	-	2	3
	RLD	2	-	2	2
	RCL	7	-	8	4
Tx RL à 15 ans (%)					
	VRL	7	-	-	-
	RLD	6	-	-	-
	RCL	13	-	-	-

Hannoun-Levi JM et al. Cancer Radiother. 2010;14:176–182

Histoire de l'IPAS

Ribeiro

Cionini

Vicini

Vicini

Polgar

Phase II

Guy's
Hungarian
Christie Hospital
Guy's
Ontario
YBCG
Hungarian
Tufts
Osaka
Czech Republic
NIC Hungary
RTOG 9517
Beaumont Interstitial
Wisconsin
Beaumont MammoSite
Ochsner
MammoSite Registry
ELIOT
German-Austrian
MammoSite Prospective
Santa Chiara
Kansas
MCV
NYU Pilot Post
Beaumont 3D-CRT
MGH Interstitial
MSKCC
German-Hungarian
NYU Post
Kaiser
European MammoSite
Harvard Proton
Colorado
Florence Post
UNC
RTOG 0319
Rush
St. Vincent
Harvard 3D
Loma Linda
TARGIT

Phase III

Eliot
Targit
Gec-Estro
NSABP
Import
Rapid

JNCI Betesda Workshop

Consensus








1982 1993 1995 2001 2000s 2003 2004 2009 2020

Développement

- Rationnel
- Historique
- Techniques
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- Consensus
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Int. J. Radiation Oncology Biol. Phys., Vol. 74, No. 4, pp. 987–1001, 2009

Printed in the USA.
0360-3016/09/$–see front matter

doi:10.1016/j.ijrobp.2009.02.031

CONSENSUS STATEMENT

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

Benjamin D. Smith, M.D.,*† Douglas W. Arthur, M.D.,‡ Thomas A. Buchholz, M.D.,†
Bruce G. Haffty, M.D.,§ Carol A. Hahn, M.D.,‖ Patricia H. Hardenbergh, M.D.,¶
Thomas B. Julian, M.D.,# Lawrence B. Marks, M.D.,** Dorin A. Todor, Ph.D.,‡
Frank A. Vicini, M.D.,†† Timothy J. Whelan, M.D.,‡‡ Julia White, M.D.,§§ Jennifer Y. Wo, M.D.,‖‖
and Jay R. Harris, M.D.¶¶

Radiotherapy and Oncology 94 (2010) 264–273

Contents lists available at ScienceDirect

Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com

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)

Csaba Polgár[a,*], Erik Van Limbergen[b], Richard Pötter[c], György Kovács[d], Alfredo Polo[e], Jaroslaw Lyczek[f], Guido Hildebrandt[g], Peter Niehoff[h], Jose Luis Guinot[i], Ferran Guedea[j], Bengt Johansson[k], Oliver J. Ott[l], Tibor Major[a], Vratislav Strnad[l], On behalf of the GEC-ESTRO breast cancer working group

GEC-ESTRO recommendations on patient selection for APBI

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[a])	pN1mi, pN1a (by ALND[a])	pNx; ⩾pN2a (4 or more positive nodes)
Neoadjuvant chemotherapy	Not allowed	Not allowed	If used

Polgár C et al. Radiother. Oncol. 2010;94:264–273

GEC-ESTRO recommendations on patient selection for APBI

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
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ER, PR status	Any	Any	–
Nodal status	pN0 (by SLNB or ALND[a])	pN1mi, pN1a (by ALND[a])	pNx; ⩾pN2a (4 or more positive nodes)
Neoadjuvant chemotherapy	Not allowed	Not allowed	If used

ASTRO recommendations : Age, RH & Her2 status

Polgár C et al. Radiother. Oncol. 2010;94:264–273

Local recurrence rate as a function of patient age in prospective APBI studies

Age (years)	HNIO phase II–III [31–36][a] Crude LR% (n)	German–Austrian phase II [41] Crude LR% (n)	WBH phase II [5] Crude LR% (n)	Wisconsin university Phase II [29][b] Crude LR% (n)	RTOG 95–17 Phase II [7] Crude LR% (n)	Örebro university Phase II [15][d] Crude LR% (n)	All studies crude LR% (n)
⩽40	33.3% (2 of 6)	0% (0 of 3)	0% (0 of 1)	0% (0 of 8)	NR[c]	0% (0 of 1)	10.5% (2 of 19)
>40–50	2.6% (1 of 39)	8.7% (4 of 46)	4.3% (1 of 23)	6.1% (4 of 66)	19% (4 of 21)[c]	12.5 (2 of 16)	7.6% (16 of 211)
>50–60	6.9% (4 of 58)	1.2% (1 of 82)	8.7% (4 of 46)	2.2% (2 of 93)	4.2% (1 of 24)	0% (0 of 19)	3.7% (12 of 322)
>60	4.3% (3 of 70)	2.1% (3 of 143)	3.9% (5 of 129)	4.2% (5 of 120)	1.8% (1 of 54)	6.7 (1 of 15)	3.4% (18 of 531)
All age	5.8% (10 of 173)	2.9% (8 of 274)	5.0% (10 of 199)	3.8% (11 of 286)	6.1% (6 of 99)	5.9% (3 of 51)	4.4% (48 of 1083)
FUP	7.3 years	5.25 years	9.7 years	5 years	7 years	7.2 years	NA

APBI = accelerated partial-breast irradiation; HNIO = Hungarian National Institute of Oncology; WBH = William Beaumont hospital; RTOG = Radiation Therapy Oncology Group; LR = local recurrence; FUP = median follow-up period; NR = not reported; NA = not applicable.

[a] Updated results by Polgar C.

[b] Updated results by Patel R.

[c] Results for patients ⩽40 years and >40–50 years were reported together.

[d] Updated results by Johansson B.

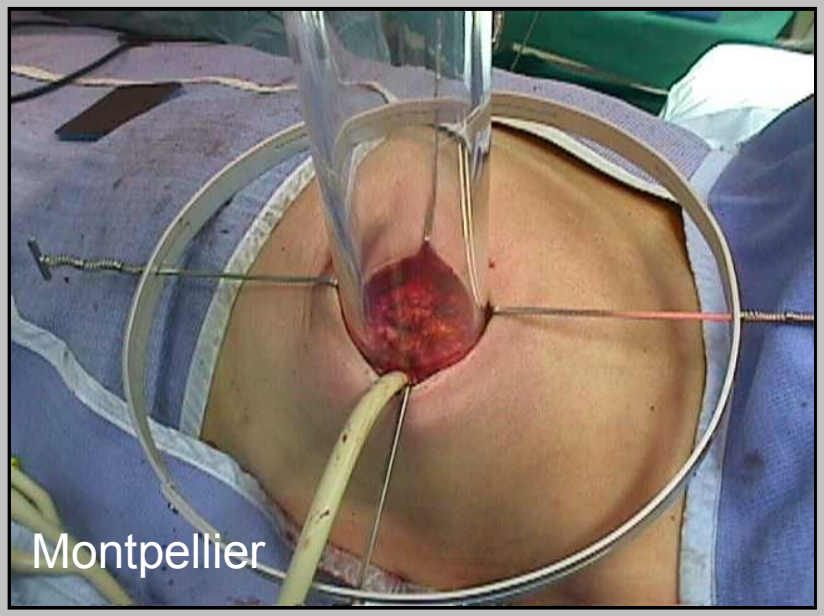
Polgár C et al. Radiother. Oncol. 2010;94:264–273

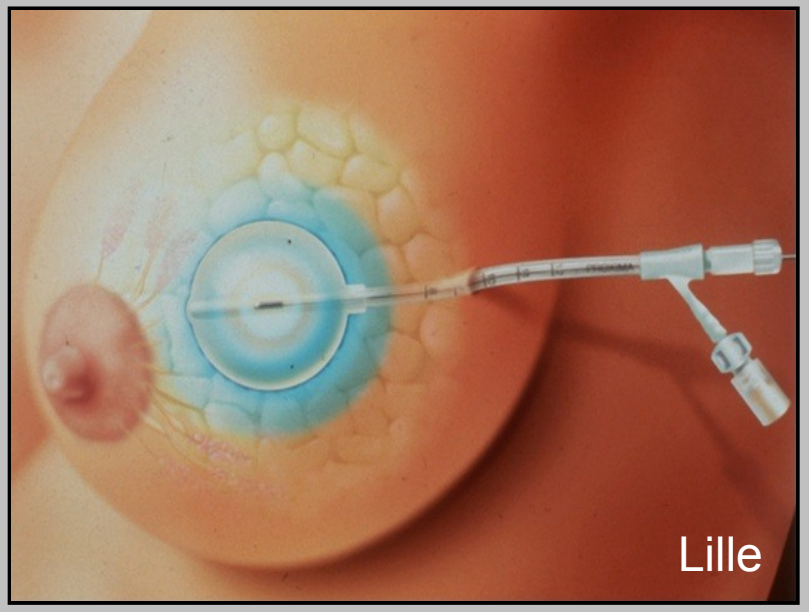
Breast Cancer Research and Treatment **81:** 243–251, 2003.

Review

Breast cancer in elderly women: is partial breast irradiation a good alternative?

J.M. Hannoun-Levi[1,*], A. Courdi[1], H. Marsiglia[3], M. Namer[2], and J.P. Gerard[1]


Montpellier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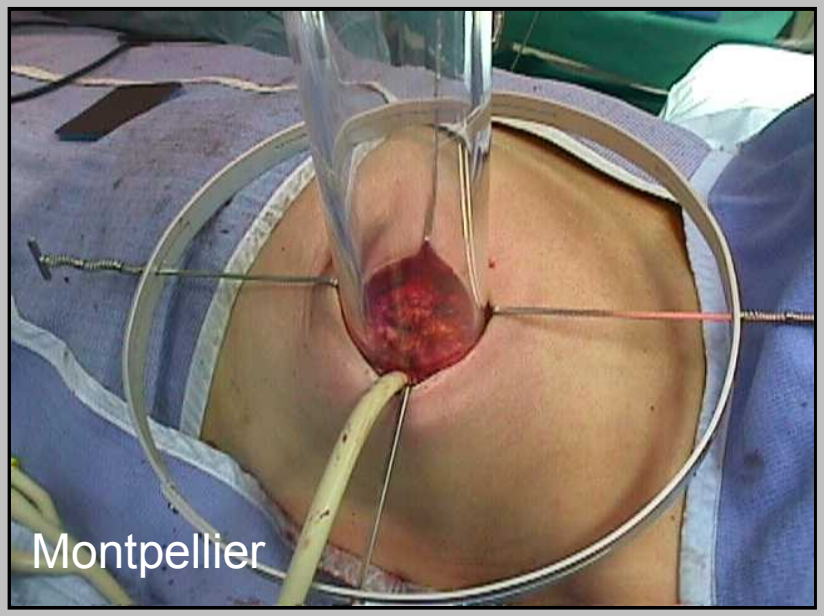
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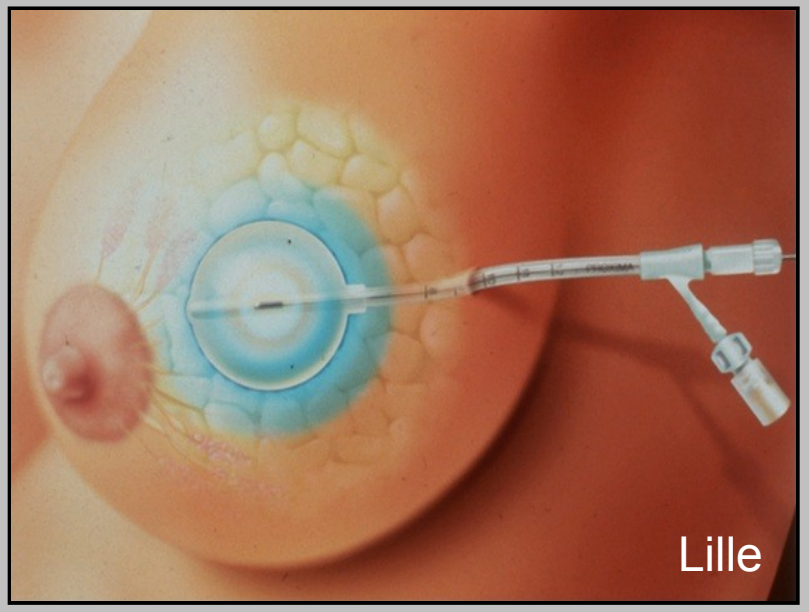
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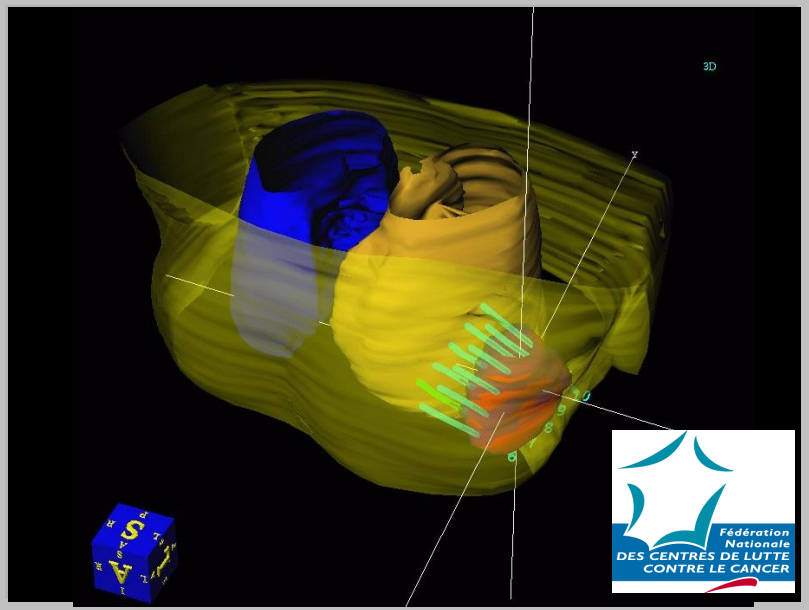
3D
Fédération Nationale
DES CENTRES DE LUTTE
CONTRE LE CANCER

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journal homepage: www.thegreenjournal.com

Phase II trial

Partial breast irradiation as sole therapy for low risk breast carcinoma: Early toxicity, cosmesis and quality of life results of a MammoSite brachytherapy phase II study

Yazid Belkacémi [a,b,e,*], Marie-Pierre Chauvet [b], Sylvia Giard [b], Sylviane Villette [a], Thomas Lacornerie [a], François Bonodeau [c], Marie-Christine Baranzelli [d], Jacques Bonneterre [b,e], Eric Lartigau [a,e]

Int. J. Radiation Oncology Biol. Phys., Vol. 76, No. 3, pp. 698–703, 2010

0360-3016/10/$–see front matter

doi:10.1016/j.ijrobp.2009.02.039

CLINICAL INVESTIGATION

INTRAOPERATIVE RADIOTHERAPY IN EARLY-STAGE BREAST CANCER: RESULTS OF THE MONTPELLIER PHASE II TRIAL

Claire Lemanski, M.D.,* David Azria, M.D., Ph.D.,*† Sophie Gourgon-Bourgade, M.Sc.,‡ Marian Gutowski, M.D.,§ Phillippe Rouanet, M.D., Ph.D.,§ Bernard Saint-Aubert, M.D.,§ Norbert Ailleres, Ph.D.,¶ Pascal Fenoglietto, M.Sc.,¶ and Jean-Bernard Dubois, M.D.*†

Hannoun-Levi JM, Marsiglia H, Belkacemi Y, Peiffert D, Hennequin C, Quetin P, Thomas L, Gourgou-Bourgade S, Gouttenoire F, Braud A.
Accelerated And Partial Breast Irradiation In Elderly Women: Gerico-03 Phase II Trail results.
Crit. Rev. Hematol. Oncol. [Abstract] 2009;72(Suppl 1):S16.

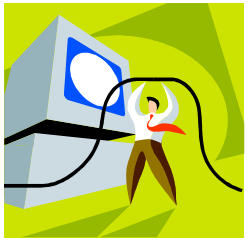
Développement

- Rationnel
- Historique
- Techniques
- Essais de phase III randomisés
- Consensus
- Perspectives

Place de l'IPAS dans le traitement du cancer du sein

Place de l'IPAS dans le traitement du cancer du sein

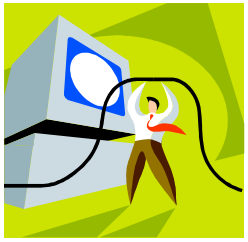
Essais phase III



Suivi significatif
≅ 10 ans

Place de l'IPAS dans le traitement du cancer du sein

Essais phase III

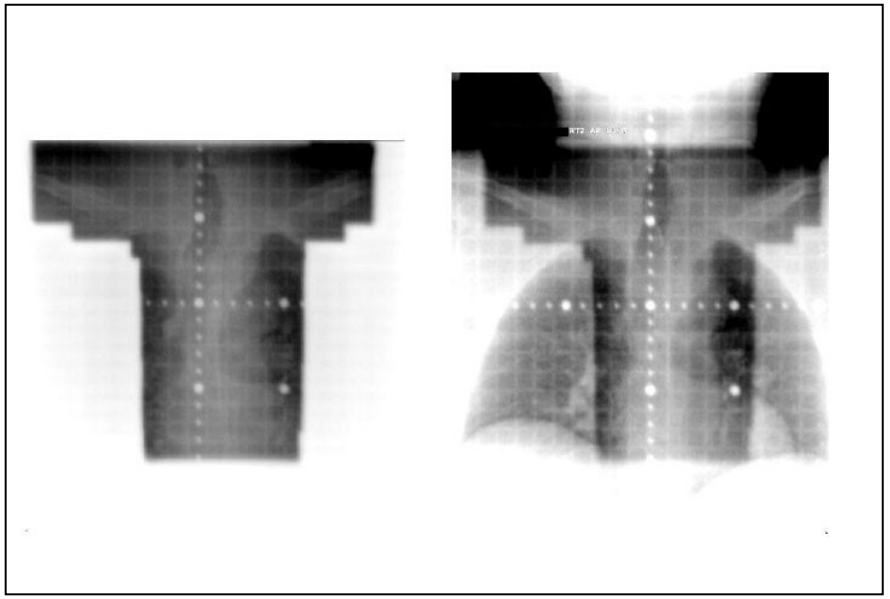


Suivi significatif
≅ 10 ans

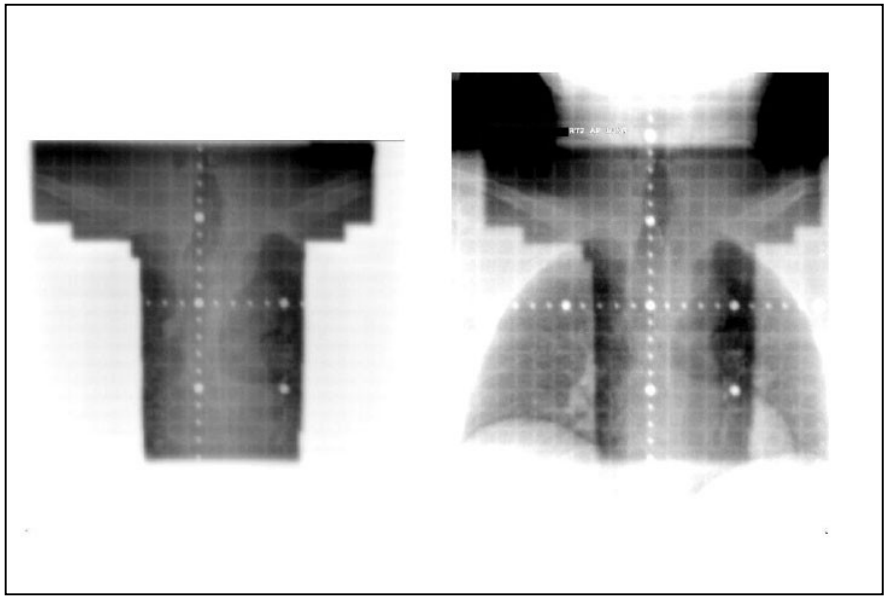
IPAS & groupe à faible risque de rechute

IPAS & situations cliniques particulières

IPAS & situations cliniques particulières



IPAS & situations cliniques particulières



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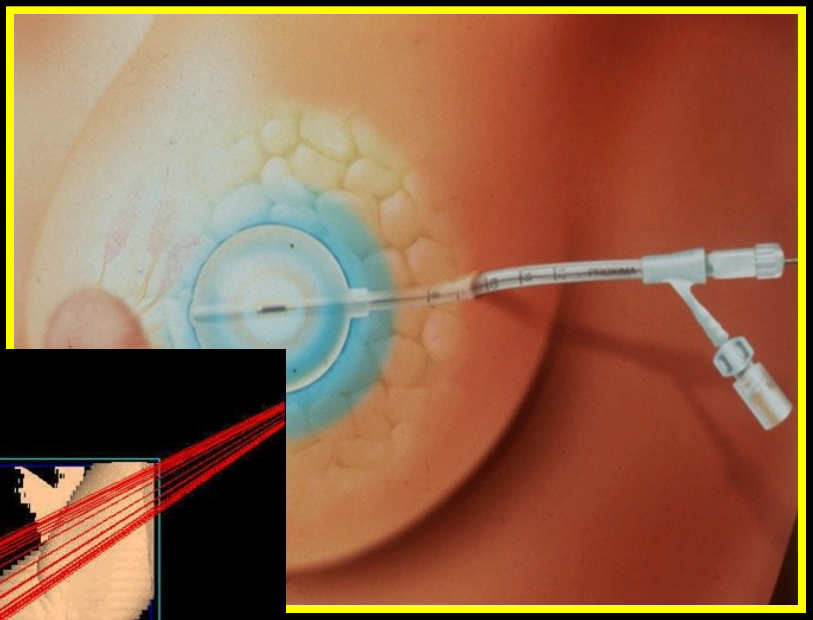

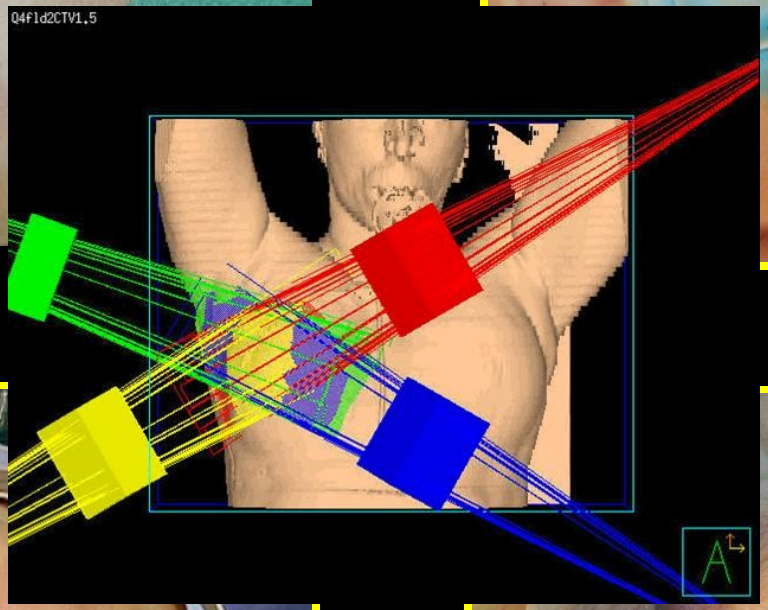
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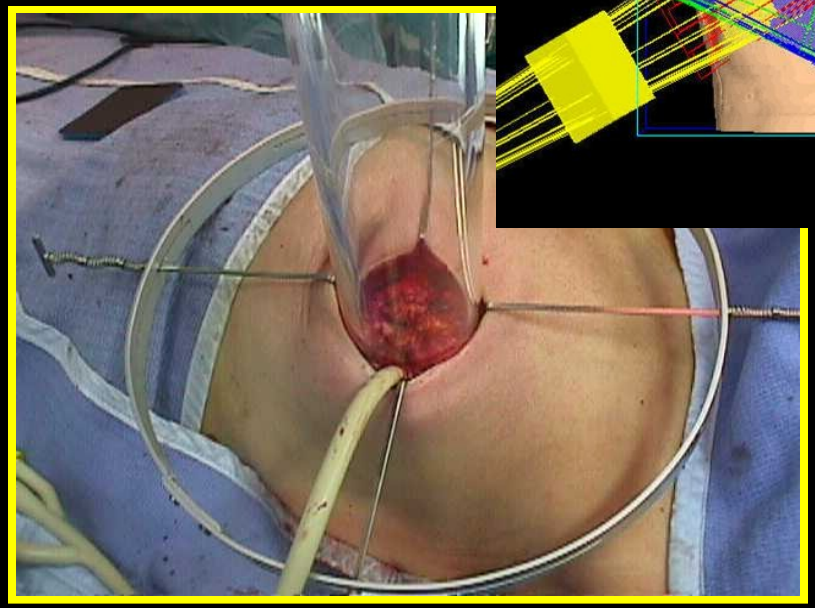

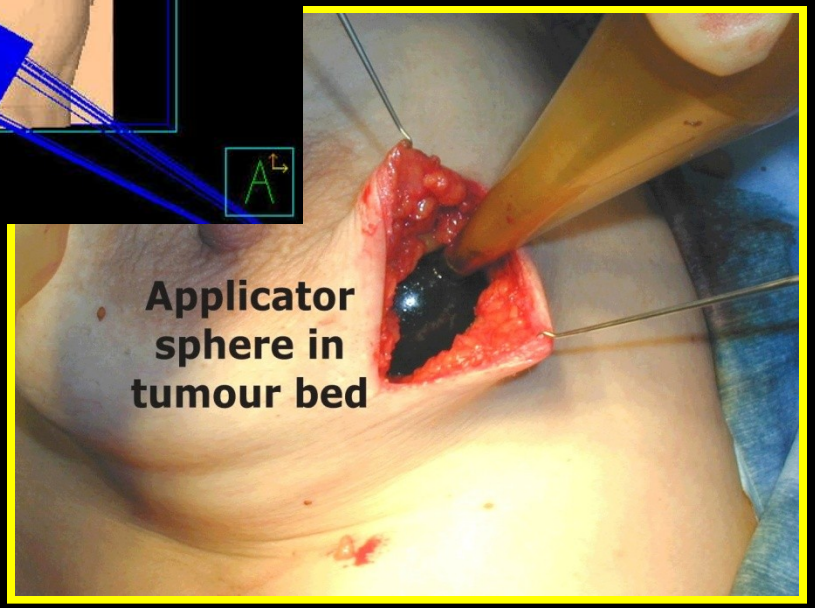
Applicator
sphere in
tumour bed

Merci de votre attention