

BrachyNext



Working Together to Shape the Future of
Brachytherapy

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Brachytherapy

Breast Brachytherapy: State-of-the art and challenging perspectives

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Breast Brachytherapy / 3S system

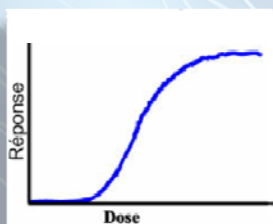
3S system



Breast Brachytherapy / 3S system

3S system

Smart dose

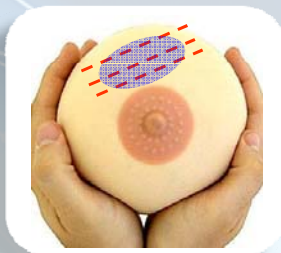
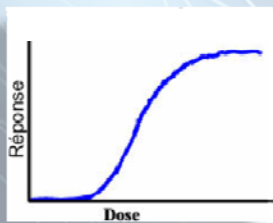


Breast Brachytherapy / 3S system

3S system

Smart dose

Small volume





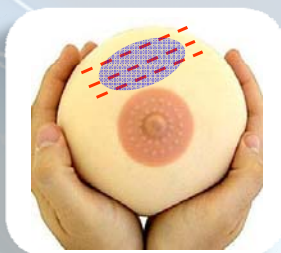
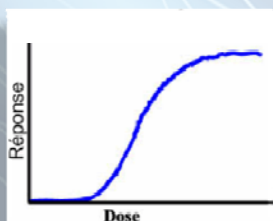
Breast Brachytherapy / 3S system

3S system

Smart dose

Small volume

Short time



Messages
from
our elders





Breast Brachytherapy = PBI

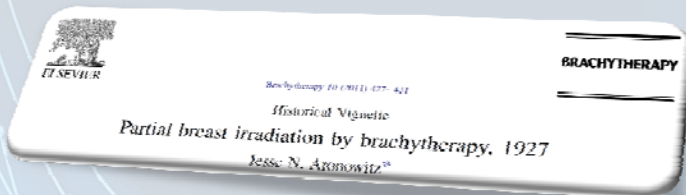


Fig. 5. Breast implant with radium needles.

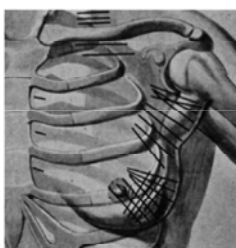


Fig. 5. Keynes's scheme for implanting the breast tumor, as well as axillary, infraclavicular, supraclavicular, and internal mammary nodal stations.

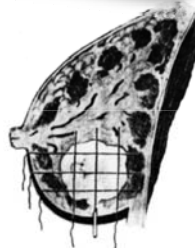


Fig. 6. Monstard's technique for homogeneously irradiating a breast tumor. Custom-cut lengths of gold tubing, of 0.3 mm thickness, thread the internal tumor (1).

Paris System Recommendations





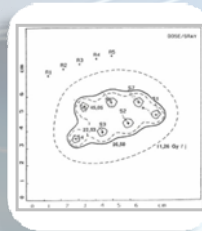
Paris System Recommendations



Geometry

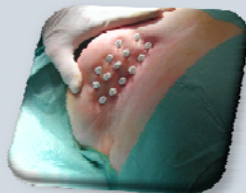


Dose distribution



Paris System "Evolution"

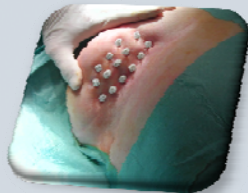
Keep the geometric rules





Paris System "Evolution"

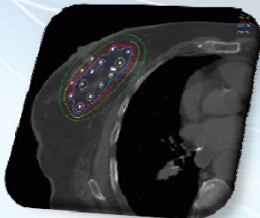
Keep the geometric rules



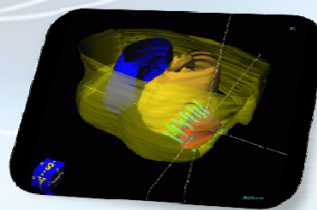
After-loading
machine



Imaging system



TPS

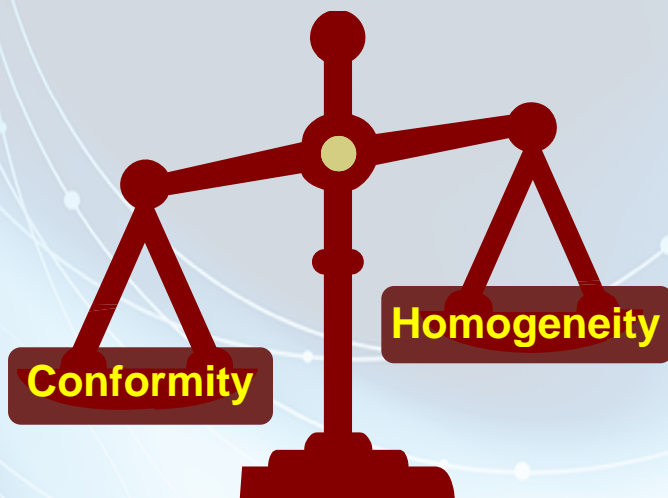


Breast Brachytherapy





Breast Brachytherapy

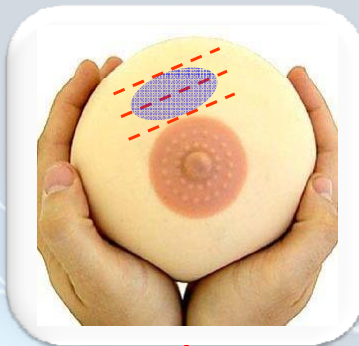


**Breast
Brachytherapy
Indications**





Breast Brachytherapy Indications

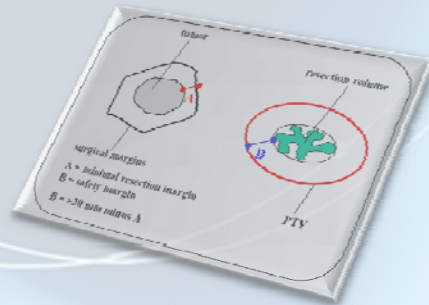


Target
Volume
Delineation





Target volume definition



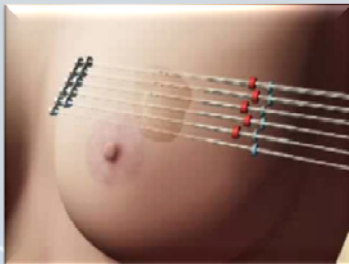
BREAST CANCER GEC-ESTRO WORKING GROUP

Breast
Brachytherapy
Technique(s)

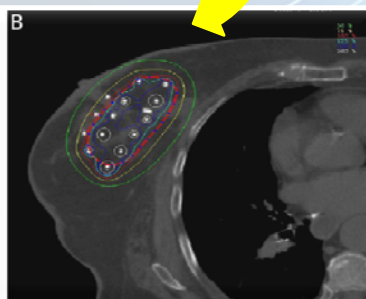
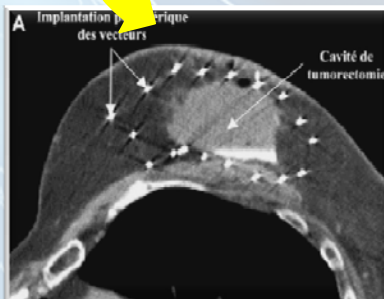
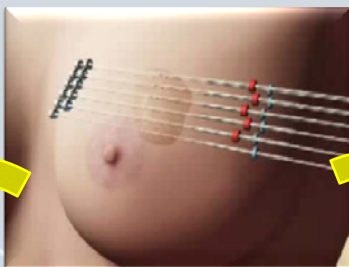




Interstitial brachytherapy

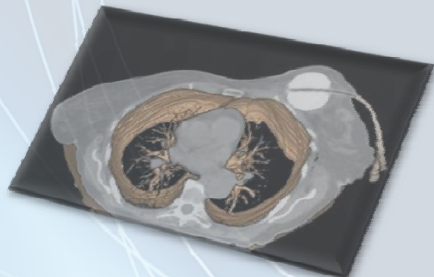


Interstitial brachytherapy

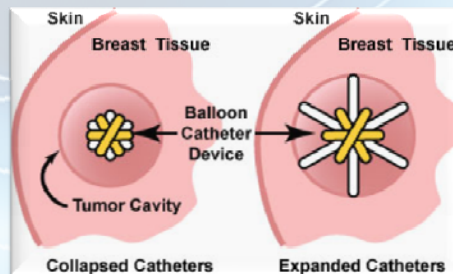
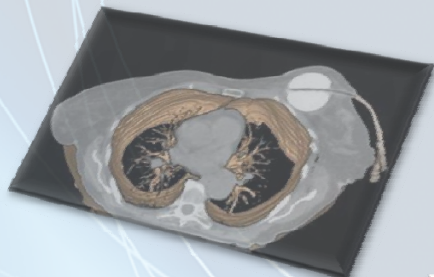




“Endocavitary” brachytherapy

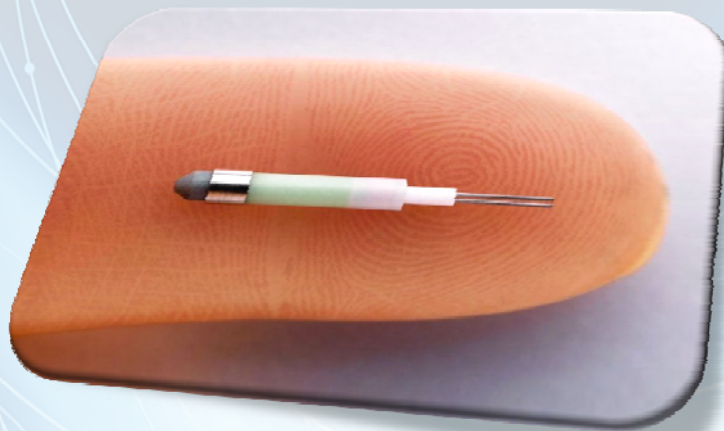


“Endocavitary” brachytherapy





Technical perspectives



Technical perspectives

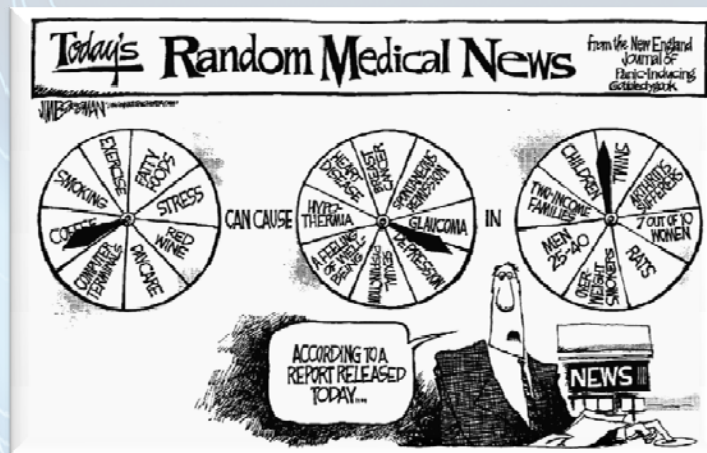




Breast Brachytherapy Clinical research



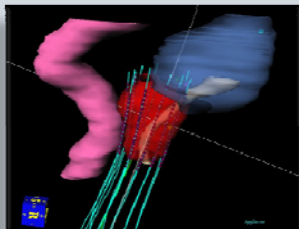
Clinical research & EBM



Vandenbroucke JP Lancet 2004;363:1728-1731



Phase III randomized trials Brachy Boost for prostate cancer



Auteurs	Nbre de pts	Suivi (mois)	HR (%)	BDD/HDD	RTExt + Curie (Gy)	Tox. G>=3 GU/GI (%)	Contrôle bioch. (%)	Survie globale (%)
Sathya	53	98	60	BDD (Ir192)	66	GU 3.8 / GI 1.9	33	87
	51				40 +35	GU 13.7 / GI 3.8	71	80 (NS)
Hoskin	111	30	50	HDD	55	G>=2 GU/GI NS	62	-
	109		54		35.75 + 2 x 8.5		79 (p=0.04)	-
Hoskin	111	85	50	HDD	55	G>=2 GU 4	48	88
	109		54		35.75 + 2 x 8.5	G>=2 GU 11 NS	66 (p=0.04)	81 (NS)

Sathya et al. JCO 2005;23:1192-9
 Hoskin et al. Radiother Oncol 2007;84:114-20
 Hoskin et al. Radiother Oncol 2012;103:217-22

Pragmatic and robust retrospective studies?



Brachytherapy 9 (2010) 313–315

BRACHYTHERAPY

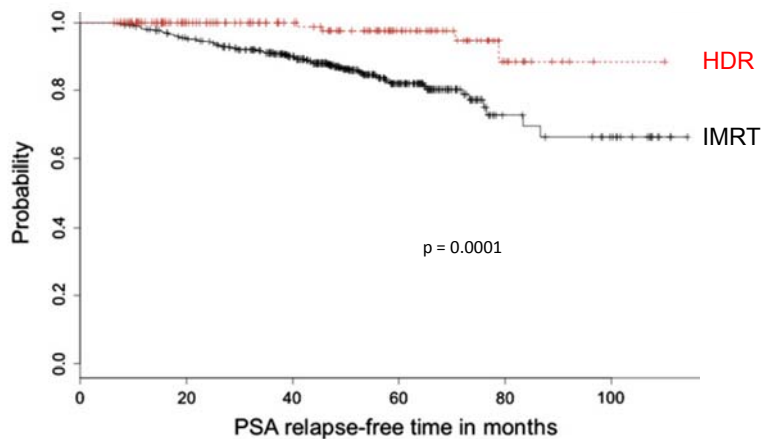
Comparison of PSA relapse-free survival in patients treated with ultra-high-dose IMRT versus combination HDR brachytherapy and IMRT

Israel Deutsch¹, Michael J. Zelefsky¹, Zhigang Zhang², Qianxing Mo², Marco Zaider¹, GilFad Cohen², Oren Cahlon¹, Yoshiya Yamada^{1,3*}





Pragmatic and robust retrospective studies?



Deutsch et al. Brachytherapy 2010;9:313-8

Clinical research & EBM

VIEWPOINT

Ethics and Regulatory Complexities for Pragmatic Clinical Trials

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Division of Cardiology, Department of Medicine, Duke University School of Medicine, Durham, North Carolina, and Duke Translational Medicine Institute, Duke University, Durham, North Carolina.

Some patients do not receive the best care possible, either because research to support clinical decision making with high-quality evidence is lacking or because evidence-based practices are not routinely implemented.¹ Pragmatic clinical trials (PCTs), which include patients in routine clinical practice settings and typically incorporate comparative effectiveness research (CER)—that is, comparing the safety and effectiveness of diagnostic, therapeutic, or delivery system options—can help overcome these challenges. The advent of research methods that use cluster randomization and leverage patient data from electronic health records (EHRs) to increase the sample size of trials at much lower costs is enabling major national initiatives to generate the data needed to improve care. These include the Health Care Systems Research Collaboratory² and the Patient-Centered Outcomes Research Network (PCORnet).

As evidenced by recent controversy,³ research that evaluates elements of usual medical practice may encounter ethical and regulatory challenges.⁴ But unless significant progress is made toward efficient functional

Nature of Interventions

Interventions that are the focus of CER and PCTs may present risk and consent issues similar to those in traditional clinical research; however, interventions directed at clinicians and systems can be categorically different. For example, testing a reminder system for clinicians or changing bathing procedures across hospital units involve interventions for which patients are not typically engaged directly. Instead, professionals are targeted for the interventions as mediators of risk, thereby complicating their ethical assessment. As those issues are addressed, it will be useful to assemble descriptions of “solutions” so that others may learn from them.

Identifying Research Participants

In CER and PCTs, it is essential to identify both direct and indirect participants in research. For example, although an intervention may be directed at clinicians or the environment, outcomes may be measured among patients and risk or benefit may extend beyond the im-

Sugarman J et al. JAMA 2014;4164

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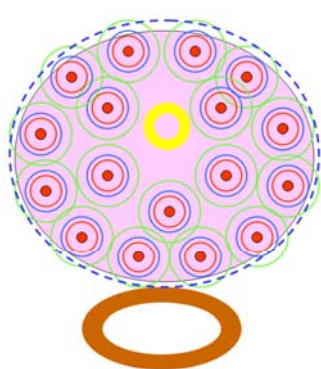
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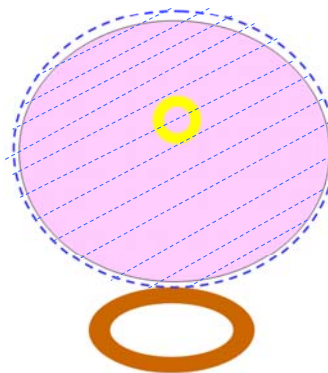


Boost Technique Randomization?

EBRT 46 Gy



HDR Brachy Boost



EBRT Boost

Hannoun-Levi et al. Cancer Radiother 2013;5:395-9

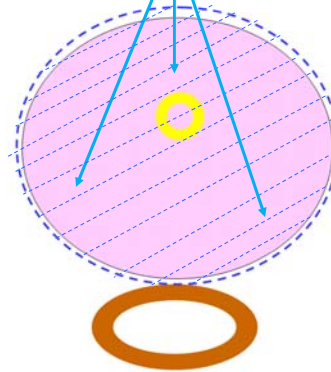
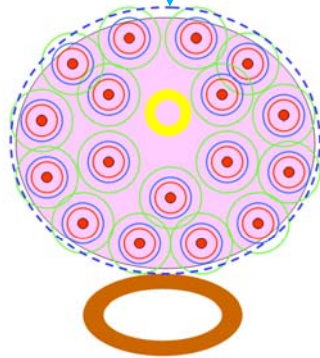


Boost Technique Randomization?

3 x 6 Gy
EQD₂ $\alpha\beta$ 3 \approx 32

EBRT 46 Gy

32 Gy
16 x 2 Gy



HDR Brachy Boost

EBRT Boost

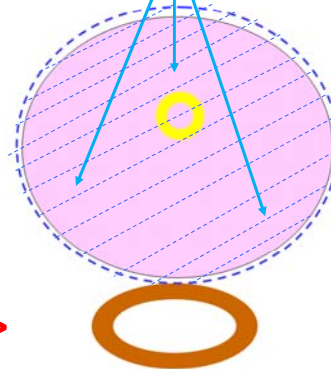
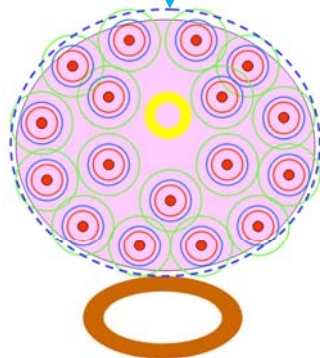
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HDR Brachy Boost

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