

Bilateral Preoperative MR Examinations in Newly Diagnosed Breast Cancer Patients: Initial and Long-Term Impact on Contralateral Breast Cancer Diagnosis

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INTRODUCTION

- **Contralateral breast of breast cancer patients: ↑ cancer risk**
- **MRI surveillance of contralateral breast**
 - **ACRIN: 3.1% (30/969) detection rate***
- **Controversy over clinical efficacy of MRI**
 - **No difference in local failure (3% vs. 4%), overall survival (86% vs. 87%), and contralateral breast cancer (6% vs. 6%)****

* Lehman CD. NEJM 2007; 356: 1295

** Solin LJ et al. JCO 2008;26: 386

PURPOSE

- **To assess whether MRI surveillance of the contralateral breast has a clinical impact in reducing contralateral recurrence at long term follow-up**

Study Population

Between Jan '04 ~ Dec '08
Breast Cancer Patients
Underwent Preoperative Imaging
(MG,US,MRI) and Surgery
(n = 3315)

Known Bilateral
Breast Cancers
(n = 18)

Palliative surgery d/t
Systemic Metastasis
(n = 49)

No 12mo FU
(n = 104)

Outside MR
Examination
(n = 50)

Inclusion Patients
(n = 3094)

Without Contralateral MRI
Surveillance, n = 1323
(btw 2004 ~ 2006)

With Contralateral MRI
Surveillance, n = 1771
(btw 2007 ~ 2008)

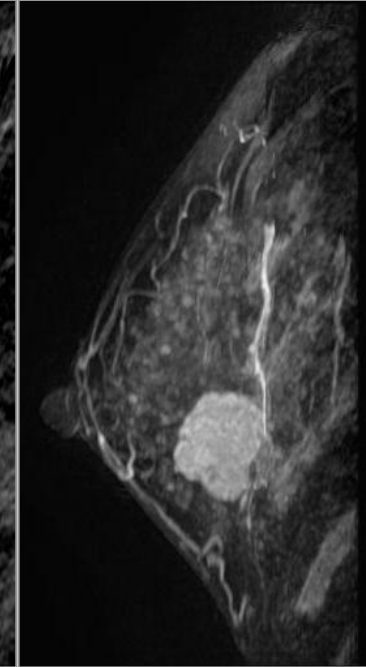
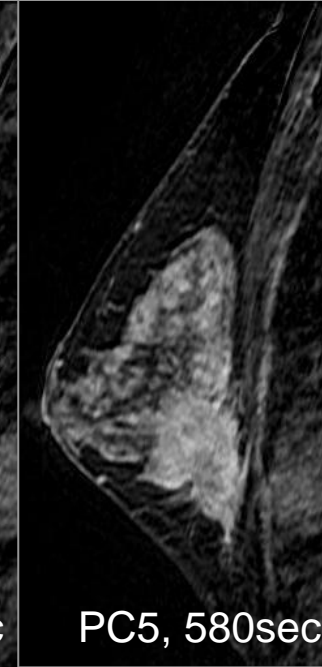
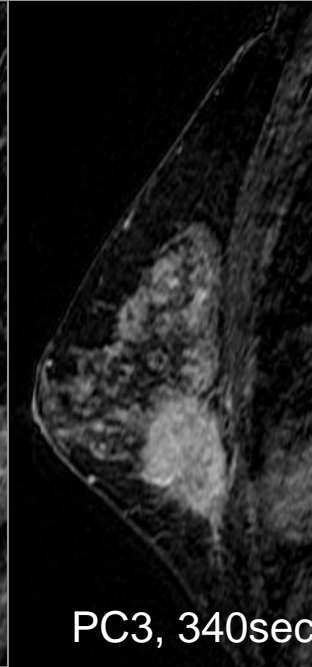
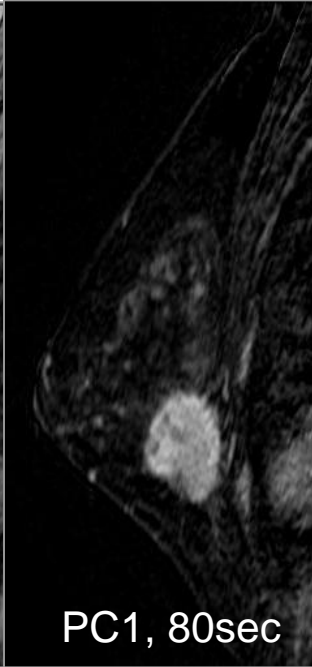
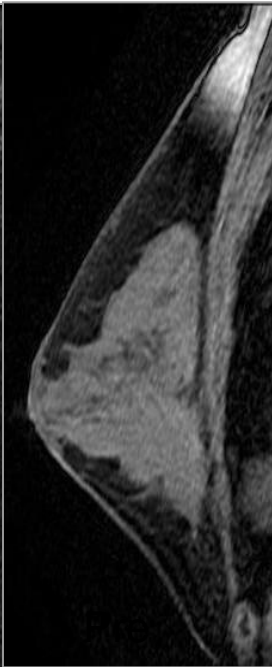
Breast MRI Protocol

T2WI

Pre

PC1~PC5 Dynamic Sub

MIP



PC1, 80sec

PC3, 340sec

PC5, 580sec

T2 fs FSE

TR/TE, 5500/85.2;
256 × 160 matrix; 200 × 200
FOV; 1.5-mm slice
thickness; no gap

Gadovist
(gadobutrol
0.1 mmol/kg),
IV injection

T1 3D fs SPGR

TR/TE ; 6.5/2.5;
320 × 160 matrix; 200 × 200
mm FOV; 1.5-mm thickness;
no gap

1.5-T Signa (GE),
Dedicated breast
coil

Patient's Characteristics

Characteristics	Contralateral Breast Surveillance				<i>p</i>
	Without Breast MRI		With Breast MRI		
	No.	%	No.	%	
Patient age at diagnosis, years					0.17
Mean \pm SD	46.8 \pm 9.0		48.2 \pm 9.7		
Range	18-81		22-85		
Type of cancer (index cancer)					0.38
Invasive	1136	85.9	1501	84.8	
DCIS	187	14.1	270	15.2	
Stage, at diagnosis					0.85
Stage 0	187	14.1	270	15.2	
Stage 1	482	36.4	638	36.0	
Stage 2	504	38.1	370	37.8	
Stage 3	150	11.3	193	10.9	
Prior surgery type					0.03
Mastectomy	473	35.8	569	32.1	
Breast-conserving surgery	850	64.2	1202	67.9	

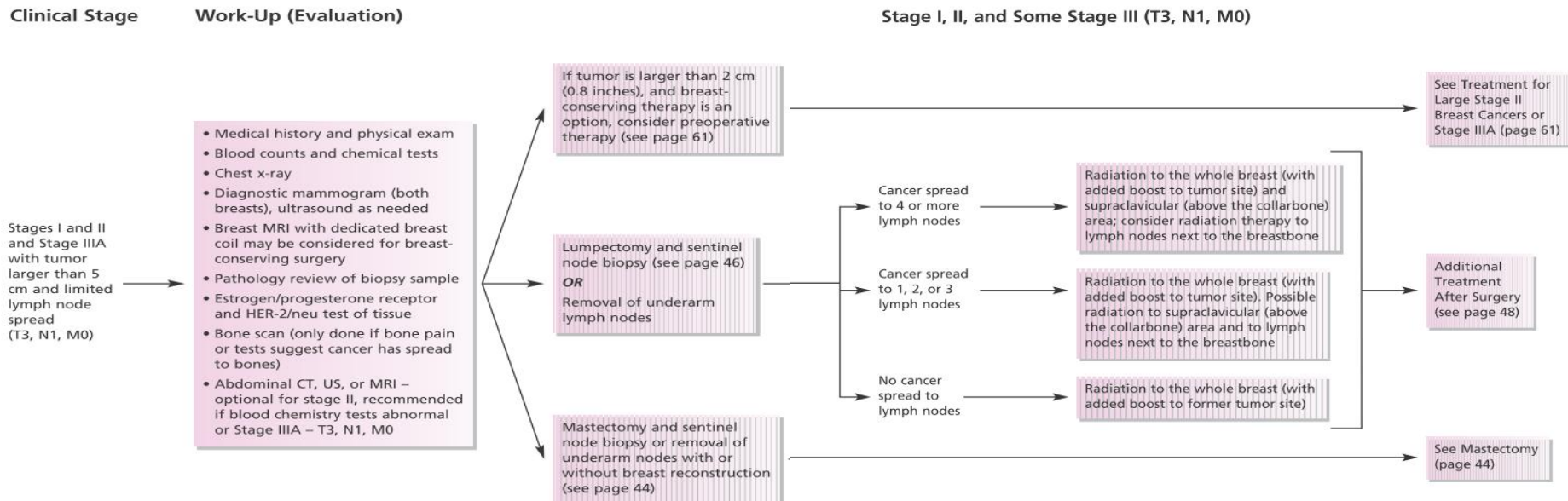
Management of Breast Cancer

- No difference in postoperative radiation therapy, chemotherapy or hormonal therapy between the two groups



National
Comprehensive
Cancer
Network

Treatment Guidelines for Patients



Data and Statistical Analysis

To compare the contralateral cancer detection rate between two groups,

- **Synchronous contralateral cancer**
 - **MG/US vs. MG/US + MR**
 - **Fisher's exact test**
- **Metachronous contralateral cancer**
 - **Cumulative incidence difference by log-rank test at 45 months**
 - **Factors a/w metachronous contralateral cancer using univariate and multivariate analysis with Cox proportional hazard model**

RESULTS

Synchronous Contralateral Cancer

Synchronous Contralateral Cancer	Contralateral Breast Surveillance				<i>p</i>
	Without MRI (n = 1323)		With MRI (n = 1771)		
	No.	%	No.	%	
MG/US detected	18	1.4	21	1.2	0.62
MRI detected	0	0	25	1.4	<0.001

Detection of Metachronous Contralateral Breast Cancer

**Contralateral
Breast
Surveillance**



**Without
MRI Group
(n = 1323)**

63 months
(range,13-94)

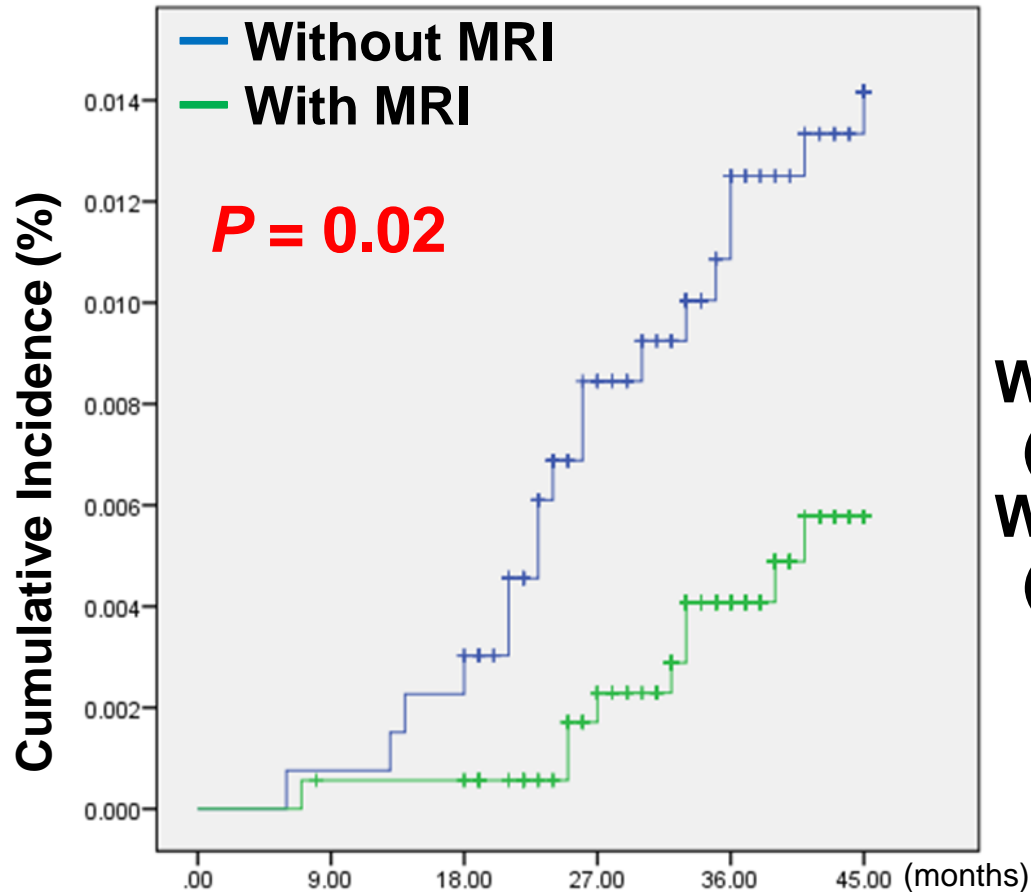
**25 contralateral cancers
4 contralateral axillary
recurrences**

**With
MRI Group
(n = 1771)**

45 months
(range,18-61)

**11 contralateral cancers
2 contralateral axillary
recurrences**

Cumulative Incidence of Contralateral Breast Cancer



Without MRI : 1.4%
(18/1305)

With MRI : 0.5%
(9/1762)

F/U duration (month)		0	9	18	27	36	45
No. of	Without MRI	0	1	4	11	16	18
	With MRI	0	1	1	4	7	9

Univariate Analysis of Factors Related to Contralateral Cancers

Characteristic	Without MRI			With MRI			Hazard Ratio	94% CI	P
	No. of Pts	Events		No. of Pts	Events				
		No	%		No	%			
Method of MRI									.025
Unilateral							1		
Bilateral							0.399	0.179-0.888	
Age									.954
< 40 years	225	4	1.78	337	1	0.29	1		
≥ 40 years	1098	14	1.28	1434	8	0.56	1.029	0.390-2.717	
Tumor Size									.164
< 4cm	1026	10	0.98	1344	7	0.52	1		
≥ 4cm	110	4	3.64	157	0	0	2.169	0.730-6.445	
Lymph Node									.133
Negative	727	5	0.69	953	6	0.63	1		
Positive	409	9	2.20	548	1	0.18	1.801	0.836-3.881	
Histologic Grade									.641
I / II	578	4	0.69	663	3	0.45	1		
III	488	5	1.03	660	4	0.61	1.254	0.484-3.251	
Type of Cancer									.290
Invasive	1136	14	1.23	1501	7	0.47	1		
DCIS	187	4	2.14	270	2	0.74	1.632	0.659-4.043	
Type of Surgery									.418
Mastectomy	473	6	1.27	569	1	0.18	1		
BCS	850	12	1.41	1202	8	0.67	1.428	0.601-3.376	

Multivariate Analysis of Risk Factors Related to Contralateral Recurrence

Variable	Hazard Ratio	95% CI	<i>P</i>
Tumor Size			
< 4cm	1		
≥ 4cm	1.94	0.63-5.99	.25
Lymph Node			
Negative	1		
Positive	1.50	0.62-3.65	.37
Method of MRI			
Unilateral Scan	1		
Bilateral Scan	0.45	0.16-0.99	.05

CONCLUSION

- **Introduction of bilateral MRI to preoperative evaluation in breast cancer patients increases contralateral cancer detection, potentially leading to the reduction of contralateral cancer recurrence at long-term follow-up**

Thank You!