

가
: 2004 10 2005 8
54 50
2.2 cm (; 0.8 - 8.5 cm)
가 1 , 2 가 10 , 3 가 1 , 4 가 6
50 38 (76%)
가, 5 (10%) 가
50 28 (56%) 가 8
(16%), 가 14 (28%)
11 (22%) . 11
9 (18%) 2 (4%) 가
가

가 (breast conserving operation)
(1 - 4). 90%
63 - 98%
(5 - 8). 50
가 30 - 48% (5, 9 - 15).
(multicentric)
가 (1).

2004 10 2005 8

54 4

50

29 - 69 , 46.2 . 22
(modified radical mastectomy)

28 (neoadjuvant chemotherapy)

가 11 가 4

가 1

1.5T Avanto (Siemens, Erlangen, Germany) . T2 TSE (T2 - weighted turbo spin echo) (axial image) T2 TSE (sagittal image) T1 3D FLASH (T1 - weighted three dimensional fast low angle shot) (TR 4.42 ms, TE 1.4 ms, flip angle 12, field of view 280 mm, matrix 512 × 256), (acquisition time) 54 , 1.5 mm , 0.2 mmol/kg Gadolinium DTPA (Magnevist, Schering, Berlin, Germany) 2 cc/sec 9 (post - processing) (standard subtraction, —) , (reverse subtraction, —) (coronal image) MIP (maximum - intensity - projection) (Time - Signal Intensity Curve)

가 0 - 23 , 4.6 HDI 5000 (Advanced Technology Laboratories, Bothell, Wash.) 5 - 12 MHz

가 2 가 BIRADS (Breast Imaging and Reporting and Data System) - MRI

lexicon BIRADS - US
lexicon

가

가

(23).

30% 30% , 30%

0,

1

(McNemar Test)

SPSS 10.0.7 for window (Statistical Package for Social Sciences, SPSS, Chicago, Ill) p 0.05

Table 1. The Results of MRI, US, and Pathologic Correlation in 50 Patients with Breast Cancer

Pathologic correlation	MRI	US
Underestimate	5 (10)	14 (28)
Equal	38 (76)	28 (56)
Overestimate	7 (14)	8 (16)

Note. Numbers in parentheses are percentages.

Table 2. MRI Findings with Underestimation or Overestimation Correlated with Pathologic Results

No.	Pathologic correlation	MRI Findings	Pathology Results
1	Underestimation	Negative*	IDC, 1 cm
2	Underestimation	Negative*	IDC, 0.8 cm
3	Underestimation	Negative [†]	Two IDC, 1.5 cm [‡]
4	Underestimation	Benign enhancement [†]	IDC, multiple
5	Underestimation	Benign enhancement	IDC, 1.6 cm
6	Overestimation	Multiple nodules	Fibrocystic change
7	Overestimation	Three nodules, 1.9 cm [‡]	Two IDC, 1.6 cm [‡]
8	Overestimation	Three nodules, 1.3 cm [‡]	Two IDC, 1.7 cm [‡]
9	Overestimation	One nodule, 5.3 cm	IDC, 3.5 cm
10	Overestimation	Multiple nodules	IDC, 1.0 cm
11	Overestimation	Multiple nodules	IDC, 2.1 cm
12	Overestimation	Two nodules, 2.5 cm [‡]	IDC, 2.5 cm

IDC = Invasive ductal carcinoma

* : MRI after mammotome.

[†]:MRI after neoadjuvant chemotherapy.

[‡]:Diameter of the largest nodule.

50 45
cm) . 2.2 cm (; 0.8 - 8.5
1
, 2
2
가 21 , 2 cm 24 . 2 cm
1 가 30 , 2 가 10 , 3
가 1 , 4 가 6
7 (14%), 가 (p = 0.041).
38 (76%), 5 (10%) (Table 1).
7 1
, 6 가
5 2
1 가
2 가
(Table 2, Fig. 1).
가
4

(56%), 8 4
, 3 1
14 (28%) 가 28
(Table 1).
가
14 6 가 , 4
2
2
가
가
11
9
가
(Fig. 2), 2 가
가 (Fig. 3).

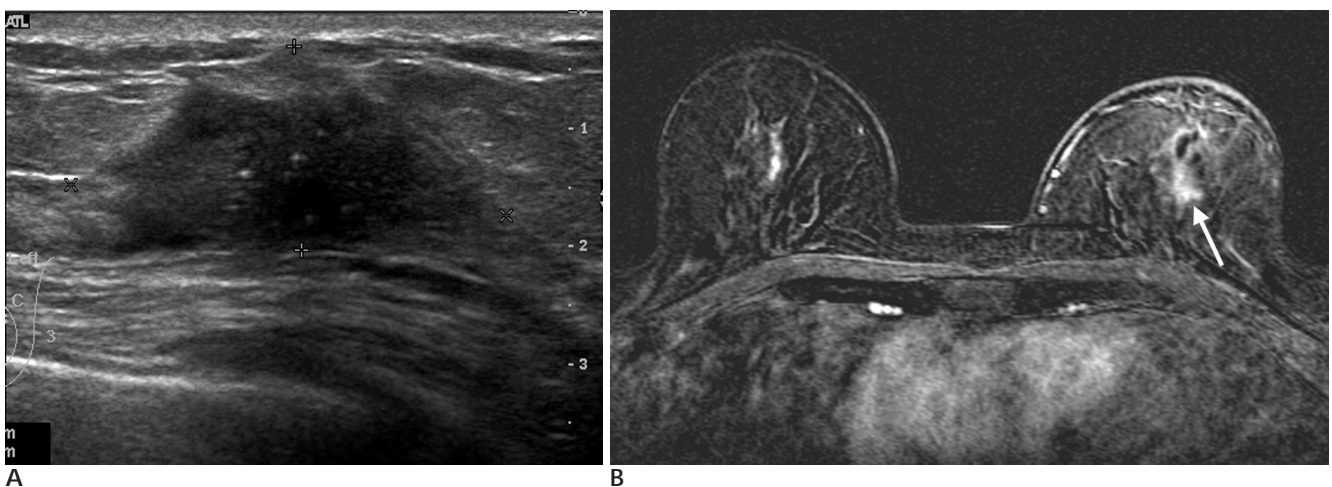
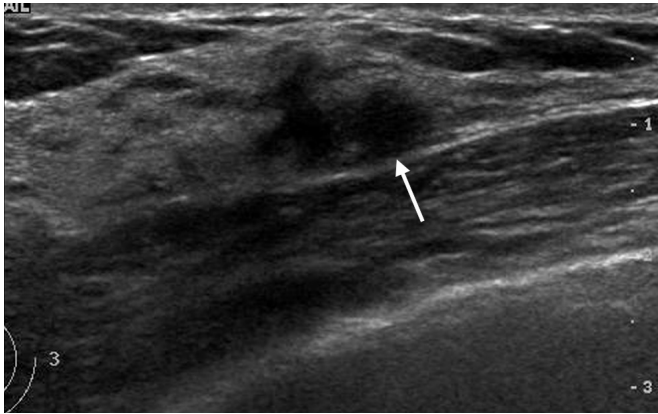


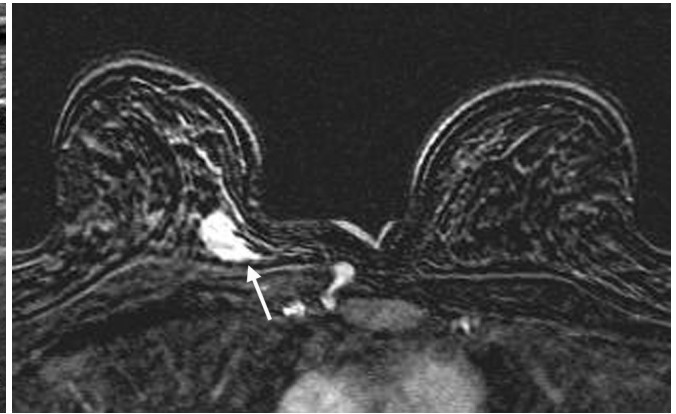
Fig. 1. 49-year-old woman with invasive ductal carcinoma in left breast.

A. After neoadjuvant chemotherapy, follow-up ultrasonography shows a 3.7×1.7 cm sized irregular and hypoechoic mass with calcification in upper center of left breast.

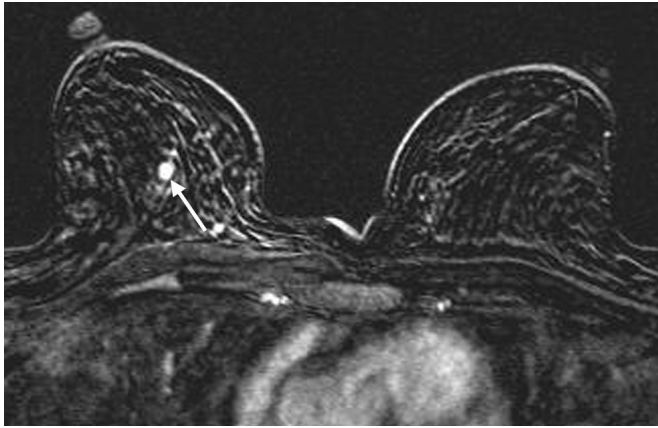
B. Early subtraction image (early enhancement image - pre-enhancement image) of MRI shows a focal enhancing area of left breast, which was considered as postchemotherapy fibrosis rather than residual tumor (arrow). Pathologic results showed 1.5 cm sized residual mass.



A



B



C

Fig. 2. 37-year-old woman with invasive ductal carcinoma in right breast.

A. Ultrasonography shows an ill-defined and hypoechoic mass with 1.3 cm in size at upper inner quadrant of right breast (arrow).

B. Early subtraction image (early peak enhancement image - pre-enhancement image) of MRI shows an irregular margined and early enhancing mass (arrow) with 1.8 cm in size, which is correlated with a sonographic lesion.

C. Nipple level image of MRI shows another 0.7 cm sized satellite nodule at inferior aspect of main mass (arrow). The surgical plan was changed from breast conserving surgery to modified radical mastectomy. A satellite nodule was confirmed as invasive ductal carcinoma.

(24).
(19). , 가 . 가
(multifocal),
가 가 가
(24).
(lumpectomy) 가
(25 - 30). 가
Berg (5) 72.9%, 가 67.8%
가
56% 76% 가
64
24 (wider excision) , 10
(open biopsy) , 18 (mastectomy)
12 가
8 - 30.6% (1),
22% . Tillman (24)
20%
6% , 11%
2%
. Schelfout (1) 30.6%
가

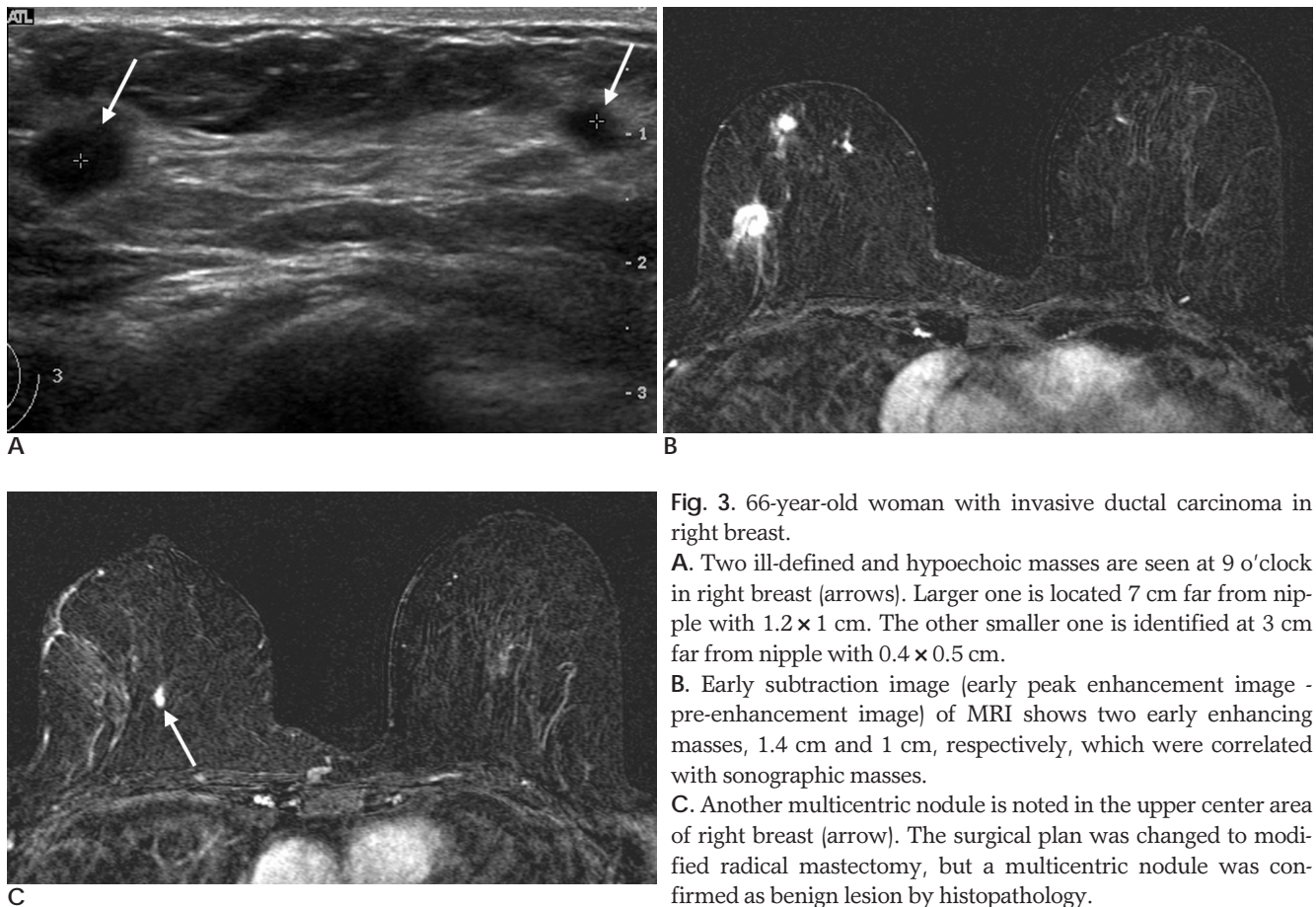


Fig. 3. 66-year-old woman with invasive ductal carcinoma in right breast.

A. Two ill-defined and hypoechoic masses are seen at 9 o'clock in right breast (arrows). Larger one is located 7 cm far from nipple with 1.2×1 cm. The other smaller one is identified at 3 cm far from nipple with 0.4×0.5 cm.

B. Early subtraction image (early peak enhancement image - pre-enhancement image) of MRI shows two early enhancing masses, 1.4 cm and 1 cm, respectively, which were correlated with sonographic masses.

C. Another multicentric nodule is noted in the upper center area of right breast (arrow). The surgical plan was changed to modified radical mastectomy, but a multicentric nodule was confirmed as benign lesion by histopathology.

(core biopsy)

3.5 - 7%

가

가 3 - 6%

(1, 18, 31).

4%

가 37 - 97%

(1, 18, 31).

가

가

가

가

가

가

가

22%

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Usefulness of preoperative breast MRI in breast cancer: Comparison with breast US¹

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Purpose: The purpose of this study was to evaluate the usefulness of preoperative breast MRI compared with breast US and pathologic finding in breast cancer patients

Materials and Methods: A total of 50 patients with breast cancer underwent surgery at our institute between October 2004 and August 2005. They were examined preoperatively with MRI and US. The maximum diameter and the number of the lesions on MRI and US were measured. These measurements were subsequently compared with the pathologic results. The results were divided into the equal, overestimated and underestimated groups. Changes of the therapeutic approach, based on MRI, were also evaluated.

Results: Breast cancer was correctly evaluated in 38 of 50 (76%) patients with MRI and in 28 of 50 (56%) patients with US; the cancer was overestimated in 7 of 50 (14%) patients with MRI and in 8 of 50 (16%) patients with US; the cancer was underestimated in 5 of 50 (10%) patients with MRI and in 14 of 50 (28%) patients with US. The therapeutic approach was changed in 11 of 50 (22%) patients, and all the cases underwent modified radical mastectomy. The therapeutic approach was correctly changed in 9 (18%) patients. Unnecessary wider excision was performed in 2 (4%) patients.

Conclusion: In conclusion, preoperative breast MRI may be a useful modality for preoperative evaluation, especially for the local staging of tumor and the treatment planning of patients with breast cancer.

Index words : Breast

Breast neoplasms, MR

Magnetic resonance (MR), comparative studies

Breast, US

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