Detecting Contralateral Breast Lesions with Bilateral Breast MRI

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Introduction and Purpose

Patients with breast cancer are at high risk of the contralateral breast cancer. It have been reported that MR imaging can demonstrate breast lesions more accurately than palpation or mammogram. The purpose of this study is to investigate if bilateral breast MR imaging with dedicated phased array-coil can detect contralateral breast lesions including cancers and to assess the frequency of its occurrence.

Materials and Methods

From July 1996 to July 2003, 380 consecutive patients with suspected breast disease underwent bilateral breast MR imaging. 250 patients were newly diagnosed breast cancer at fine-needle-aspiration or core-needle or excisional biopsy. Other patients were examined because of equivocal findings on mammographic or sonographic findings, follow-up study after breast-conserving therapy, and follow-up study for indeterminate lesions detected by previous MR imaging. Our MR criteria for breast cancer included morphology and contrast kinetics. Lesions with spiculated or indistinct borders, heterogeneous or rim enhancement and wash-out time course were considered malignant. Scattered punctuate or patchy diffuse continuous enhancements were considered benign. In all patients, high-quality two-view mammography was performed before MR imaging, and 11-Mhz sonography of both breasts was performed before (n=16) or after MR imaging (n=12).

All patients were examined using 1.5-T MR scanner (either Signa Horizon Echospeed or Signa Infinity Twinspeed; GE Medical Systems, Milwaukee, WI). All examinations were performed in a prone position using dedicated breast-array coil. Precontrast axial and coronal T1-weighted images (2DFSPGR; TR/TE /FA=140/4.2/70) and coronal fat-suppressed T2-weighted images (FSE; TR/TE= 4000/105) were followed by dynamic fat saturated 3DFT T1-weighted images (IR prepared fat saturated 3DFSPGR; TR/TE/TI/FA= 4.4-4.7/1.2-1.4/40-50/15, 256 x 192 matrix, 28 cm 3/4 rectangular FOV, 3-4.4 mm thickness, 52 partitions, imaging time 60 seconds). The 3D data set was acquired before the contrast administration and the same data acquisitions were repeated for four to seven times after contrast administration. A dose of 0.1 mmol/kg of gadodiamide hydrate (Omniscan; Daiichi-Pharmaceutical, Tokyo, Japan) was intravenously administered through a 22- gauge peripheral catheter using a power injector (Nemoto Kyorindo, Tokyo, Japan) followed by a 20 ml saline flush at a rate of 2 ml/sec. As a delayed image, coronal fat saturated T1-weighted images (2DFSPGR; TR/TE /FA=140/2.2/70) were also obtained.

Results

MR detected 34 contralateral breast lesions in 28 out of 380 patients (7.4% individuals). All the patients were women with a median age of 49 years (range, 36-78 years). More than two contralateral breast lesions were found in 6 patients. The median size of the contralateral breast lesions was 0.8 cm in diameter (range, 0.3-2.0 cm).

For 20 of these 34 lesions (16/28 patients), biopsy was performed. US-guided fine-needle-aspiration was performed for 15 lesions and US-guided core-needle for one lesion and/or excisional biopsy for 11 lesions. Carcinoma was present in nine (45%) of biopsy proven 20 lesions (8/16 patients). Six (67%) of nine lesions (6/8 patients) were invasive ductal carcinoma, and three (33%) of nine lesions (2/8 patients) were ductal carcinoma in situ (DCIS). The median size of the carcinomas was 0.95 cm (range, 0.5-2.0 cm). Benign lesion was present in 11 (55%) of 20 lesions (8/16 patients). Six (55%) of 11 lesions (5/8 patients) were mastopathy, three (27%) of 11 lesions (2/8 patients) were fibroadenoma, and two (18%) of 11 lesions (1/8 patients) were intraductal papilloma. The median size of the benign lesions was 1.0 cm (range, 0.5-1.9 cm). Two (10%) of 20 lesions were detected only on MR images, one of which was invasive ductal carcinoma, and another of which was mastopathy. The foremer one lesion (invasive ductal carcinoma) was not seen on sonography before MR imaging, however, ‘second look’ sonography after MR imaging identified the lesion. Twelve (60%) of 20 lesions were detected on both MR images and sonogram. Four of 12 lesions were invasive ductal carcinoma, three of 12 lesions were mastopathy, three of 12 lesions were fibroadenoma, and two of 12 lesions were intraductal papilloma. Three (15%) of 20 lesions was detected on both MR images and mammogram, and one of which was DCIS and two of which was mastopathy. Three (15%) of 20 lesions was detected on MR images, sonogram and mammogram, and two of which were DCIS and one of which was invasive ductal carcinoma.

For 14 out of 34 contralateral breast lesions (12 /28 patients), biopsy was not performed. Ten of these 14 lesions were detected only on MR images. Two of 14 lesions were detected on both MR images and sonogram. One of 14 lesions was detected both on MR images and mammogram. One of 14 lesions was detected on MR images, sonogram and mammogram. Thirteen lesions (13 women) were traced by mammography and sonography for three months in one patient, six months in three patients, or more than one year in seven patients. For these 14 lesions, there has been no finding suggestive of malignancy during this observation period.

Discussion and Conclusion

According to previous investigators, the frequency of synchronous bilateral breast cancer found with contralateral MRI is 3-5%. In our series, it was 3.2% of 250 patients with index carcinoma, which was 29% of 28 patients with the contralateral (MR detectable) breast lesions, and 50% of 16 patients who underwent biopsy of the contralateral (MR detectable) breast lesions.

Although the clinical importance of picking out contralateral breast cancer, especially DCIS is controversial and may require larger cohort study before being established, similar to previous investigators, we have found MR imaging is the sensitive screener for contralateral breast lesions including cancers in our clinical settings.