

A survey on diagnostic value of MRI for contralateral breast lesions in women with breast cancerGhasem Janbabai^{1*}, Roohollah Abdi², Hadi Majidi³, Mahdi Zolfaghar khani⁴, Seyyedeh Samaneh Borhani⁵¹Cancer Research Center, Mazandaran University of Medical Sciences, Sari, Iran, (Corresponding Author).**E-mail:** Janbabai@yahoo.com² Department of Radiology, Imam Khomeini Hospital, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran³Department of Radiology, Imam Khomeini Hospital, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran⁴ Department of Radiology, Imam Khomeini Hospital, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran⁵Cancer Research Center, Mazandaran University of Medical Sciences, Sari, Iran

Abstract: Risk of contralateral breast cancer in woman with history of breast cancer is high, and early detection is an important issue. The aim of this study is to evaluate diagnostic value of contralateral breast MRI in women with recently diagnosed breast cancer. In this diagnostic study, 150 patients with primary breast cancer referring to Tooba clinic and private clinics were investigated before beginning of chemotherapy. In order to screening of contralateral breast cancer in these patients' mammography and ultrasonography done, if result of these modality were normal patients underwent breast MRI. After contralateral breast MRI on 150 patients, 10 cases (6.6%) were benign, 4 (2.6%) were highly suggestive of malignancy which eventually were confirmed by biopsy reported by pathologist. Three cases (2%) were suspiciously abnormal and others (88.6%) were negative which had a significant difference ($P \leq 0.05$). In our study, MR imaging could detect breast lesions in 90% of patients with recently diagnosed breast cancer not detected by physical examination and contralateral breast mammography. This finding is comparable with previous reports of detecting 30-88% of breast cancers with MR imaging.

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Key words: contralateral breast cancer, breast MRI, X-ray mammography

Introduction

Risk of contralateral breast cancer in women with previous breast cancer is 2-6 times greater than general population (1, 2, 3, and 5).

Management options for asymptomatic contralateral breast cancer include close observation, blind contralateral biopsy, chemoprevention, and prophylactic mastectomy (4).

Due to knowledge advances about increased risk of contralateral breast cancer, early diagnosis is an important issue (5). Detection rate of breast lesions is 0.2%-1.0% with clinical examination, 2-3% with ultrasonography, and 1-3% with X-ray mammography (6). It has been reported that detection rate with MRI is 3-24% in contralateral breast lesions (7). Contrast-enhanced MRI has a high sensitivity but moderate specificity for the diagnosis of breast cancer. DCE MRI has significantly increased sensitivity and specificity of MRI in characterizing breast lesions (8).

The ability of MRI in detection of breast lesions has made it a better screening tool for breast cancer. However, cost of MRI and its variable specificity prohibit routine use of this tool (9).

The present study is designed to evaluate diagnostic value of DCEMRI for contralateral breast cancer and determine its power in detection of hidden centers in women with recently diagnosed breast cancer and normal ultrasonography and mammography results.

Materials and methods:

In this prospective study, 150 patients with primary breast cancer who referred to oncology clinic for chemotherapy, were investigated from Sep.2010 to Oct.2012. In our survey, patients were chosen according to inclusion and exclusion criteria and underwent MRI before chemotherapy and hormone therapy. Inclusion criteria including all patients with primary breast cancer in one breast definitively diagnosed by a pathologist and screening of contralateral breast cancer by physical examination, ultrasonography and mammography done and the results were normal.

Exclusion criteria include MRI contraindications (pregnancy, pacemaker, magnetic aneurysm chips, other magnetic devices, and claustrophobia), palpable abnormality in examination or mammography and ultrasonography, previous

biopsy in last 6 months, and previous chemotherapy or hormone therapy.

After selection, patients went under breast MRI with 1.5 T Siemens system at Partomazand Imaging Center in Sari. Dynamic contrast enhanced MRI (DCEMRI) was used in this study. MRI had ≥ 1.5 T power and was performed with breast surface coils.

The MR images were reported by a radiologist. The lesions were divided to 5 groups according to shape, margins, distribution and internal structure: 1-negative; 2-benign; 3-probably benign; 4-suspicious abnormality; and 5- highly suggestive of malignancy.

Patients in groups 4 and 5 went under biopsy and final diagnosis was made by a pathologist. These lesions (groups 4 and 5) had following properties: focal mass with irregular speculated margins and ductal distribution, or solid mass with rim enhancement or homogeneous regional enhancement in less than a quadrant (fig.1, 2, 3). After taking biopsy, samples were sent to pathology laboratory of Imam Khomeini Hospital and reported by a pathologist. The results of all patients were recorded in an individual questionnaire.

Statistical analysis of data was done with routine statistical methods by SPSS software. Chi-square and Fischer exact tests were used to analyze qualitative variables. For comparing qualitative and quantitative variables, we used independent T-test and P value less than 0.05 was considered significant. After data analysis, finding the results and comparing them with previous researches, final report was prepared.

Results

In this descriptive diagnostic study, 150 patients with history of primary breast cancer referring to Tooba oncology clinic in Sari. Mean age of study population was 48.2 ± 8.1 years (32-56.5) and there was no significant difference in age and other features between study population ($P < 0.05$). Thirteen patients (8.6%) had a history of breast diseases (apart from cancer) and 18 patients (12%) had a familial history of benign breast disease which did not show significant difference ($P < 0.05$). Familial history of breast cancer was reported in 7 patients (4.6%).

Mean age of first pregnancy in study population was 23.4 ± 5.1 years old and mean number of children was 3 (0-7). Among patients in this study, 68.4% had complete breastfeeding period. This difference was not statistically significant. Also 25.8% of cases were nulliparous and other patients were multiparous which showed statistically significant difference ($P < 0.05$).

As mentioned, lesions were divided to 5 groups according to shape, margins, distribution and internal structure. Among 150 patients undergoing

contralateral breast MRI, 10 cases (6.6%) were benign and 4 cases (2.6%) were highly suggestive of malignancy which eventually were confirmed by biopsy reported by pathologist. Three cases (2%) were suspiciously abnormal and others (88.6%) were negative which had a significant difference ($P < 0.05$). Suspicious cases were sent for biopsy which one was diagnosed as malignancy. This finding was considered significant ($P < 0.05$).

Finally, according to statistical information obtained from the data resulted in the present study, positive and negative predictive value of MRI was respectively 94% and 91%. Sensitivity and specificity of this modality in evaluation of contralateral breast lesions in high risk women was 89% and 93% respectively.

Discussion

In this study aimed to determine the positive predictive value of MRI in detection of hidden breast lesions, 5 of 150 patients (3.3%) undergoing MRI had contralateral breast malignancy.

Sensitivity and specificity in evaluation of breast lesions was 89% and 93% respectively. These results are reported differently in various studies. In different studies, breast MRI had a sensitivity of 94-100% and specificity of 37-97% in detection of breast lesions (7). In study of Fischer et al, 4.5% of cases had contralateral breast cancer which was detected by MRI (12). This report is higher than previously reported by Slanetz's study (13). These differences are the result of high sensitivity and relatively low specificity of MRI. Differences of sample size could also be the reason of variety in results of above studies.

Percentage of false positive cases by MRI is also significant. Two cases (1.3%) in this study were false positive which is comparable with false positive cases (4.4%) reported by Lee et al (10). However, clinical trials to find ways for reducing false positive cases seem to be necessary.

Similar to Taneja's study (7), none of the patients were reported as false negative in our study because no patient underwent prophylactic mastectomy. However, in a study by Steven et al, 6 patients underwent prophylactic mastectomy all which were not malignant (11).

High negative predictive value, sensitivity, and specificity for using MRI in detection of malignant breast lesions were resulted in this study. These findings suggest that this modality is significantly effective in reducing unnecessary biopsies and surgeries.

X-ray mammography is still a proper screening tool but may not be as sensitive in detection of contralateral breast lesions in patients with previous

breast cancer because it is usually smaller or in younger patients who have dense breasts (7). Ultrasonography also is an operator dependent modality. American Cancer Society has recently recommended contralateral breast screening with MRI in patients with breast cancer in its guidelines (11).

This study showed a high sensitivity, specificity, accuracy, and negative predictive value. According to the results, suspicious mammography reports which need a biopsy or surgery could be detected by using breast MRI. This prevents unnecessary biopsies and surgeries. As discussed, all 4 patients with a MRI report of breast malignancy had breast cancer.

However, one of three suspicious cases was confirmed as a breast malignancy by pathology report which is statistically significant and representative of positive predictive value of MRI.

Familial history of breast cancer is a known risk factor for breast cancer and it was evaluated in present study. There was a significant relationship between this factor and development of contralateral

breast lesions. Lehman also achieved to a similar result in his study in 2005 (9).

In our study, MR imaging could detect breast lesions in 90% of patients with recently diagnosed breast cancer not detected by physical examination and contralateral breast mammography. This finding is comparable with previous reports of detecting 30-88% of breast cancers with MR imaging.

It can be concluded that in women with recently diagnosed breast cancer with normal reports of ultrasonography and mammography, we can detect hidden focal lesions with the help of MRI and have a final diagnosis without requiring invasive procedures. However, considering the small sample size and neglecting possible effective factors, further studies are recommended in future.

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Conflict of Interest

None declared.

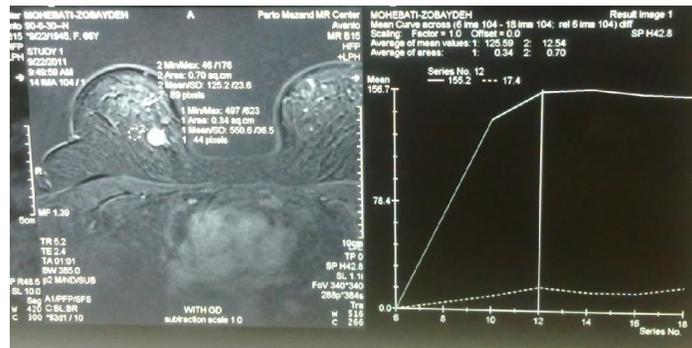


Fig.1: 66 years old women with post contrast fat-suppressed T1 of right breast round lobulated enhancing mass has seen.rapid initial enhancing with washout as shown in kinetic curve suggestive for malignancy

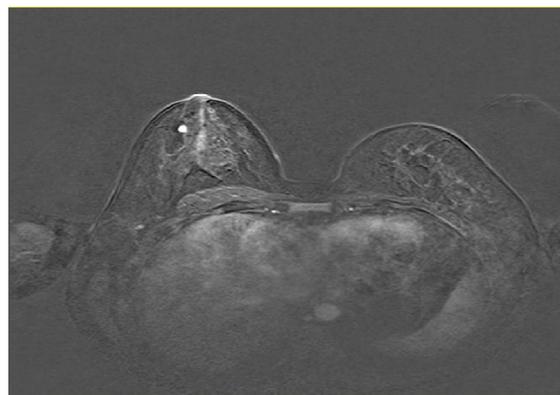


Fig.2: MRI of Ductal carcinoma; Speculated right enhancing mass in 37 years old women has seen.

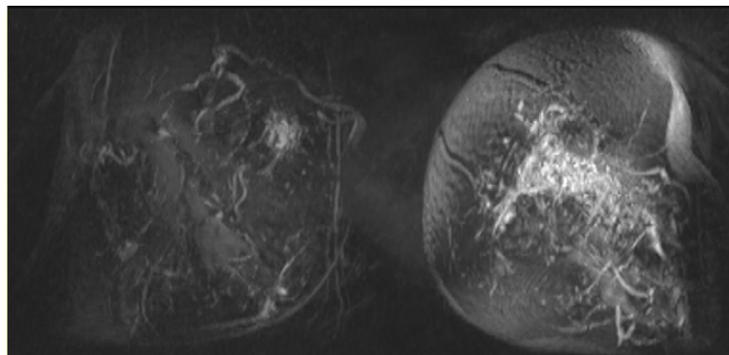


Fig.3: T1 and 3D post contrast of infiltrating carcinoma; heterogeneous and speculated enhancing mass has seen in right breast (40 years old women).

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