A.R. Ehsanbakhsh MD[1]
F. Sailanian Toosi MD[1]
N. Khorashadizadeh MD[1]

Different BIRADS Categories in Screening and Diagnostic Mammography

Background/Objective: Breast cancer is the most common cancer among Iranian women. The mean age of these cancer patients is one decade younger than that of other developing countries. The aim of this study was frequency determination of Breast Imaging Reporting and Data System (BIRADS) subcategories, especially, higher categories and analysis of its related factors in the patients referred to the radiology department of Valie-Asr Hospital, Birjand.

Patients and Methods: The study was performed on 437 female patients from June 2006 to May 2007. Patients were divided into two groups; namely, those who underwent screening mammography and those who underwent diagnostic mammography. An expert radiologist reported the mammograms according to BIRADS classification. SPSS ver 12 software and Chi-square test were used for statistical analysis and P-value was significant under 0.05.

Results: The mean age was 43.8±9 years. Eighty-one percent of the mammograms were diagnostic and only 19% of them were screening mammographies. Unilateral breast pain was the most common symptom (29%) of which 68% were premenopausal. Fify-five percent of them had a history of OCP consumption. The overall BIRADS classification frequencies were: category 0: 9 (3%), category 1: 85 (19%), category 2: 268 (61%), category 3: 37 (8%), category 4: 22 (5%), category 5: 16 (4%). A positive test result (BIRADS categories 4 and 5) in our study was 10.7% in the diagnostic group and 1.2% in the screening group (p=0.007). Five percent of all patients had a familial history of breast cancer.

Conclusion: Screening mammography is recommended for early evaluation and early diagnosis of breast cancer.

Keywords: Breast Cancer, Mammography, BIRADS

Introduction

Nowadays, breast cancer is the most common cancer among women and also the second leading cause of death.[1] According to the American Cancer Society, about 1.3 million women are diagnosed with breast cancer annually worldwide and about 465000 die from the disease. Only in 2008, 182460 women were dignosed with invasive breast cancer in the United States.[2]

It is the most common cancer among Iranian women too.[3] Screening mammography is not defined in the Iranian health care system and there are some reports that patients consult medical advice and are diagnosed in an advanced stage of breast cancer. According to the Iranian Ministry of Health and Medical Education in 2004, 7000 women are affected by breast cancer annually and there are 70000 breast cancer patients in this country with a prevalence of 15.5%.[4] The mean age of breast cancer in Iran is one decade younger than developing countries (40-49 years versus 50-60 years).[4]

Mammography is a highly sensitive method for the detection of clinically occult breast cancer. Almost all literatures and major medical organizations recommend screening mammography for women 40 years of age or older. This reduces breast cancer mortality by about 20-35% in women aged 50-69 years and

1. Assistant Professor, Department of Radiology, Valie-Asr Hospital, Birjand University of Medical Sciences, Birjand, Iran.

Corresponding Author:
Ali Reza Ehsanbakhsh
Address: Department of Radiology, Valie-Asr Hospital, Ghaffari St., Birjand, Iran.
Tel: +98561-444-3001
Fax: +98561-223-3427
Email: a.r.ehsanbakhsh@gmail.com

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Table 1. BIRADS Categories, Assessment and Recommendations[11]

BIRADS Category	Assessment	Recommendation(s)
0	Assessment incomplete	Need to review prior studies and/or complete additional imaging
1	Normal	Continue routine screening
2	Benign finding	Continue routine screening
3	Probably benign finding	Follow-up mammogram at six months
4	Suspicious abnormality	Perform biopsy, preferably needle biopsy
5	Highly suspicious of malignancy	Biopsy and treatment, as necessary
6	Known biopsy-proven malignancy, treatment pending	Assure that treatment is completed

20% in women aged 40-49 years.[5,6]

Unfortunately, screening mammography is not defined in the Iranian health care system program. An additional problem in mammography is the different reporting methods of mammograms by radiologists. Interpretation of mammograms are various among radiologists, consequently leading to different recommendations. This may cause confusion for the patient and her clinician. The American College of Radiology (ACR) has developed the Breast Imaging Reporting and Data System (BIRADS) since 1993, which is intended to standardize the terminology in mammographic reports, the assessment of the findings, and the recommendation of the action to be taken.[7] However, our radiologists are still not widely used to this reporting system.

It seems that Iranian patients consult doctors laterand are diagnosed with more advanced stages of breast cancer.[8-10] Therefore, the purpose of this study was to determine the frequency of each BIRADS category in our mammograms, especially categories 4 and 5 (advanced categories) and also comparing this study with other similar studies and detecting the effective factors in this probable difference.

Patients and Methods

Between June 2006 to May 2007, 437 women were referred to the Radiology Department of Valie-Asr Hospital in Birjand for mammographic imaging. After taking a complete history, mommographic evaluation was performed in the craniocaudal and mediolateral views by Metaltronica (Flat model) mammography equipment. All the patients were included in the study, except for patients who had a previous surgery or any manipulation such as excisional biopsy or breast prosthesis. Patients were divided into two groups: 1- Screening mammography was defined as those performed in asymptomatic women with a negative clinical breast examination and 2- Diagnostic mammography was performed in those who had a breast problem such as breast pain, mass or discharge. An expert radiologist evaluated all mammograms according to the BIRADS classification.

There are seven assessment categories based on the BIRADS system. The main aim of this system was to eliminate confusion regarding multiple mammographic reports in order to clarify the findings and the recommendations (Table 1).

BIRADS categories 1, 2 and 3 are classified as negative and BIRADS categories 4 and 5 are classified as positive test results.[12]

All data were analyzed by SPSS version 12. Chi-square test was used for statistical analysis and P-value was considered significant under 0.05.

In addition, we assessed the adjusted associations between variables including menstrual status, number of pregnancies, history of OCP consumption, positive family history of breast cancer and chief complaint with mammographic results by multivariable logistic regression model.

Results

Mammographic findings according to BIRADS categories are summarized in Table 2.

The mean age of the patients was 43.8$\pm$9 years. Among the 437 patients, 167 (38.2%) were younger than 40 years of age, 178 (40.7%) were 41-50 years old and 92 (21.1%) were older than 50 years of age. According to this categorization, most frequent positive BIRADS categories were seen in patients younger

than 50 years of age (78.9%). However, only 16.4% of this age group came for screening mammography.

Summarized demographic findings and statistical analyses are shown in Table 3.

Among the 437 patients, breast pain was the most common chief complaint, which was detected in 215 patients (49.2%).

In this study, the distribution of different BIRADS categories was evaluated in the diagnostic and screening mammograms. Based on this, in diagnostic mammograms, 10.4% (354 patients) of the patients had positive test results and in the screening group, 83 patients (1.2%) were positive. The most positive test result was noted in patients with a breast mass (28%).

Sixty eight percent of the patients were premenopausal. Ninety nine percent of the patients were married. Fifty five percent of them had a history of oral contraceptive consumption. Five percent of the patients had a familial history of breast cancer.

Sonographic evaluation was available in 20% of the patients. This report was benign in 18% and malignant in 2% of the patients.

Using the logistic regression analysis (Table 3), none of the study variables such as age, first menstrual period, number of pregnancies, oral contraceptive consumption and even a positive familial history of breast cancer were predictive parameters of BIRADS category determination (P-value> 0.05). Only presence of the mass variable remained in the model. According to this analysis, the odds ratio (OR) for this variable was 49.7 (CI 95%: 6.6-374.1, P-value≤0.001).

Discussion

There are many advanced imaging modalities for breast evaluation today, such as ultrasonography or magnetic resonance imaging (MRI). MRI is more sensitive than mammography in high-risk women, but the specificity is lower and it is recommended for the screening of women at high risk for breast cancer and not for general population screening.[6]

However, mammography is still the main and most important method for breast cancer detection. Indeed, the most important advantage of mammography is detecting very small cancers.[13-16]

The mammographic abnormality most frequently associated is not cancer in approximately 95% of the cases.[6] In this study, negative test results (BIRADS categories 1, 2 and 3) were detected in 91.3% of the patients; in which 89.3% were in the diagnostic group and 98.8% were in the screening group.

Breast pain was the most common cause of refer-

Table 2. Mammographic Findings According to BIRADS Categories

Categories	0	1	2	3	4	5	Total
Number	9	85	268	37	22	16	437
Percentage	3	19	61	8	5	4	100

Table 3. Demographic Findings and Statistical Analysis

Variables		Negative BIRADS Categories (n=399)	Positive BIRADS Categories (n=38)	OR (CI 95%)	P-Value
Age (years)		43.9 ± 9.1	43.9 ± 7.6		0.88
First menstrual age (years)		14.1 ± 1.8	13.7 ± 1.5		0.2
Menstrual status	Premenopausal	270 (90.6%)	28 (9.4%)		0.45
	Postmenopausal	129 (92.8%)	10 (7.2%)	0.75 (0.35-1.58)	
Number of pregnancy	0-2	94 (91.3%)	9 (8.7%)		0.35
	3-5	190 (89.6%)	22 (10.4%)	1.21 (0.54-2.73)	
	≥ 6	115 (94.3%)	7 (5.7%)	0.64 (0.23-1.77)	
OCP consumption		221 (92.5%)	18 (7.5%)	0.72 (0.37-1.41)	0.34
Family history of breast cancer		21 (95.5%)	1 (4.5%)	0.49 (0.06-3.72)	0.48
Chief complaint	Pain	204 (94.9%)	11 (5.1%)	0.39 (0.2-0.8)	0.01
	Mass	67 (72%)	26 (28.0%)	10.74(5.16-22.34)	<0.001
	Discharge	46 (100%)	0 (0%)	0.90 (0.87-0.93)	0.03
	Screening	82 (98.8%)	1 (1.2%)	0.1 (0.01-0.77)	0.007

ence (Table 3). However, the vast majority of the patients with breast pain had no serious abnormal mammographic findings. Ninety five percent of these patients were in BIRADS categories 1, 2 and 3, which are negative test results. In comparison between chief complaints, we considered breast pain as the reference group (OR=1), and breast mass was the most alarming symptom (OR=7.2 and P-value was significant <0.001) (Table 3).

Eighty percent of these patients were classified as BIRADS categories 1 and 2 (Table 2). In a large study by Poplock et al.,[17] the frequency of BIRADS categories 1 and 2 were 91.11% and category 3 was detected in 7.10% of the patients. In this study, 8% of the patients were in category 3, which was similar to Paplock's study and a positive test result (BIRADS categories 4 and 5) was 10.7% in the diagnostic group and 1.2% in the screening group. On the other hand, in this study, BIRADS categories 4 and 5 were 5% and 4%, respectively (Table 2), but in Poplock's study, these numbers were 1.63% and 0.16%, respectively. The mentioned differences could be due to late admission of the patients. In addition, in our study, screening mammography was only performed in 19% of the patients, which is very low corresponding to our total population, and the majority (81%) of mammographies in our center were diagnostic.

In another study by Tuncbileh et al.,[18] clinical outcome mammograms of 7506 women were assessed in two groups; 91% of the patients were in the screening group and 9% were in the diagnostic group. Cancer outcomes in the screening and diagnostic groups were compared and reported as follows: cancer detection rate, 0.61% versus 8.64%; mean invasive cancer size, 15.5 mm versus 24.5 mm; minimal cancers, 38% versus 19%; stage 0-1 cancers, 50% versus 21%; and lymph node negativity, 76% versus 29%, respectively. Indeed in the diagnostic group all these outcome criteria are more serious and at more advanced stages. There is a higher percent of screening mammographies in Tuncbileh's study compared to this study (91% versus 19%) and positive BIRADS categories are also significantly higher in the diagnostic group in his study.

In conclusion, the most common suffering symptom was breast pain, but the most alarming chief complaint was breast mass. The most frequent BIRADS category reported by the radiologist was category 2, which is indicative of a benign breast lesion. However, in comparison with other similar studies, screening mammograms were lower and the positive categories (4 and 5) in our study were higher. The fact that none of the variables such as age, first menstrual age, OCP consumption and even a positive familial history of breast cancer was predictive parameters of BIRADS category determination may be due to the low number of patients in this study and we need to evaluate larger groups.

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