Determining the relative frequency of ultrasound findings in women under 30 years of age with a breast mass

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Abstract

Introduction: Mammography and ultrasound are the most reliable and common imaging techniques for early detection of breast mass. The aim of this study was to determine the relative frequency of ultrasound findings in women under 30 years of age by a feeling of mass in the breast. **Methods:** This cross-sectional study was performed on women under 30 years of age with a feeling of mass in the breast. The result evaluated in this study was the final opinion of the radiologist on the ultrasound report, which was expressed in the form of Breast imaging-reporting and data system (BIRADS) based on one to five scores. Ultrasound status of patients was reported to be normal, fibrocystic changes, and tumors (solid-cystic-mixed). The obtained data were analyzed using SPSS statistical software version 23. Significance level was considered to be < 0.05. **Results:** The most common reason for referral was palpable mass in the left breast (56.2%). The shape of the mass was oval in most cases (91.2%). The highest frequency in terms of mass margin was related to Macrolobulated (82.4%), Hypoechoic (85%), and Solid (87.6%). Most of masses belonged to 12 o'clock (21.2%). According to the standard sonography report based on BIRADS, the highest frequency belonged to B4a (57.5%). Pathology report showed that the highest frequency was related to fibroadenoma (71.4%). **Conclusion:** Considering that most of the cases in this research with a feeling of mass in the breast in women under 30 years of age were BIRADS 4, and among the cases that underwent biopsy, 14.5% were diagnosed with cancer pathology. Therefore, ultrasound examination is very important in these cases, even at a young age.

Keywords: Biopsy, breast mass, mass margin, mass shape, ultrasound

Introduction

Breast cancer accounts for 30% of all female malignancies and is the second leading cause of cancer death in women. The incidence of this cancer has been reported to be 1 in 8 women and its risk has been estimated to be 12.5%. Despite the growing incidence of breast cancer, the overall mortality rate remains almost constant, indicating progress in early diagnosis.[1-4] In studies, various factors increase the risk of breast cancer, including old age, positive family history, premature menarche, late menopause, history of non-breastfeeding and use of Combined Oral Contraceptive Pill (OCP).[5-7] Breast cancer incidence and mortality are also associated with increasing age, and the highest rate of breast cancer in the world is between the ages of 50 and 55 years. The age of onset in Asian women is a decade lower than in Western countries, probably due to the younger population in Asia.[8-12] Early detection of breast cancer

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is the ultimate goal of radiology and the role of the radiologist is crucial at this stage. Mammography screening has reduced mortality in women over the age of 50 by 22% and has also led to a 15% reduction in mortality among 40-49 years old women.[13]

Due to the incidence of breast cancer at a younger age in recent years, the presence of dense breast tissue in this group and the possibility of lesion hidden in this type of tissue, the existence of a complementary diagnostic method seems necessary to increase the sensitivity of the diagnosis. It has been shown that mammographic sensitivity is strongly affected by breast tissue density, so that increasing breast density is associated with decreased mammographic sensitivity, and mammographic sensitivity in women with dense breasts may be reduced by 30 to 48%.[14] More than half of women under the age of 50 years and at least one-third of women over the age of 50 years have dense breast tissue, although this group is at risk for a longer period of time and has a worse clinical prognosis. Mammography is the standard method for breast screening. This method is less sensitive in cases of high breast tissue density, such as young women under 30 years. Increased parenchymal density of the breast is one of the causes of false negatives in mammography, which is caused by various reasons such as fibrocystic changes or systemic causes such as the use of hormonal drugs. These changes are also more common at a younger age.[12] Given the increase in false-negative cases in mammography of patients with dense breast tissue, it is recommended to use other complementary methods in screening these patients.[13] Tangible breast mass is one of the most common features of breast cancer. However, clinical features are often nonspecific.

Pre-sample imaging is used to describe the nature of the mass. For women who have been diagnosed with a breast mass clinically, the vast majority also need an ultrasound evaluation. Diagnostic mammography is the primary method of choice for women over 40 years of age. Ultrasound is usually necessary unless there is a definite benign mass as a clinical cause.[15] Therefore, the aim of this study was to determine the relative frequency of ultrasound findings in women a palpable breast mass under 30 years of age.

Materials and Methods

This cross-sectional study was performed on women under 30 years of age with breast mass sensation in 2020-2021 in Akbarabadi and Firoozabadi hospitals in Tehran, Iran. The sampling method was convenience sampling and patients with inclusion and exclusion criteria were included in the study. Inclusion criteria included: age under 30 years, absence of cancer and feeling of mass in the breast. Exclusion criteria included: women under 30 years with cancer and patient dissatisfaction with ultrasound. According to the inclusion criteria, 80 patients were included in the study.

Procedure

Initially, demographic information and patient history were obtained based on a direct interview with the patient. Then, the result evaluated in this study was the radiologist's final opinion on the ultrasound report, which was expressed in the form of data system and breast imaging report (BIRADS) (1 to 5). Cases of BIRADS 1 and 2 were patients with perfectly normal ultrasound or benign findings without the need for follow-up. BIRADS 3 cases are potentially benign findings that require 6 months of follow-up. BIRADS cases 4 and 5 are suspected malignancies that require sampling. Also, sonographic status of patients was reported as normal, fibrocystic changes, and tumor (solid-cystic-mixed).

Data analysis

The results were expressed as mean and standard deviation for quantitative variables and as frequency and frequency for stratified qualitative variables. Comparisons between quantitative variables were performed by independent t-test or by Mann-Whitney test if there was an abnormal distribution. Comparisons between qualitative variables were performed using Chi-square test or Fisher's exact test. The obtained data were analyzed using SPSS statistical software version 23. Significance level was considered to be < 0.05.

Ethical considerations

After obtaining the consent of the ethics committee, all information collected was kept confidential. All patients obtained oral consent to participate in the study. Patients' private and personal information was protected. All participants entered the study after full knowledge of the study process and obtaining written consent. Dissatisfaction with participating in this study did not prevent non-volunteer patients from using the facilities of this center at the right time to treat their disease. The participants in the project adhered to all Helsinki ethical declarations. Ethical Code: IR.IUMS.FMD.REC.1399.122.

Results

A total of 80 individuals were included in the study with a mean age of 24.94 ± 4.08 (minimum age of 12 and maximum age of 30 years), half of whom were married. The mean body mass index of the subjects was 22.55 ± 2.57. Also, the majority (69.5%) of subjects had a normal body mass index with a minimum body mass of 17 and a maximum of 29. The reason for referral of participants in the study was examined. The highest reason for referral (45 patients; 56.2%) was related to the palpable mass in the left breast, followed by the palpable mass in the right breast (34 patients; 42.5%) and the palpable mass in both breasts (1 patient; 1.2%)). The duration of symptoms in 26 patients (32.5%) was less than one month, followed by one month to one year (37 patients; 46.2%) and more than one year (17 patients; 21.2%).

The distribution of cancer history in family members was examined and 69 patients (86.2%) had no history of cancer and 11 patients (13.8%) had a history of cancer in family members. In terms of palpable mass shape, 73 patients (91.2%) had oval

mass, followed by irregular mass (7 patients (8.8%). No case of round mass was observed. The highest frequency of mass margins was related to circumscribed masses (82.4%), of which 41 were macrolobulated, which were placed in the Circumscribed category according to the guideline.

Comparison of sonographic findings in the subjects based on age was shown in Table 1. The mean age of patients with malignant mass was significantly higher than individuals with benign mass (P = 0.04).

Table 2 compared the sonographic findings of the subjects based on BMI. As showed here the average mass index was not significant (P = 0.7).

The relative frequency of ultrasound findings in women under 30 years of age presenting with breast masses based on marital status is listed in Table 3. According to results, a significant relationship was found between marital status and mass margin and the nature of the mass, so that Macrolobulated margin was found to be the most common among single and married people.

Based our findings presented Table 4, no significant relationship was observed between family history of cancer and sonographic findings.

Discussion

Mammography and ultrasound are the most reliable and common imaging techniques for early detection of breast mass. Early detection of a tumor is associated with a better prognosis of cancer. Therefore, it is the duty of every physician to diagnose abnormal breast cases in the early stages and make definitive diagnostic measures.[16] Therefore, the aim of this study was to determine the relative frequency of ultrasound findings in women under 30 years of age with a mass in the breast.

In this study, the mean age of 80 participants was 24.94 ± 4.08 years. Half of the subjects were married. Also, the majority of subjects had a normal body mass index. Based on the findings of the present study, it was found that the most common cause of referral was palpable mass in the left breast. The most common duration of symptoms was one month to one year, and most people did not report a history of breast cancer in family members. The shape of the mass was oval in most cases. The highest frequency in terms of mass margin was related to the circumscribed mass. The highest frequency of mass echoes was related to hypoecho. The highest frequency in terms of the nature of the mass was related to solid cases. The highest frequency in terms of mass direction was related to the mass parallel to the skin axis (95%). The majority of the masses had no calcification. Vascularity of palpable mass was observed in nearly half of the subjects. The highest frequency was related to the location of the mass in the mid zone. The highest frequency in terms of mass time was related to 12 o'clock.

Table 1: Comparison of sonographic findings in the subjects by age

age	frequency	mean	Statistics	P
Mass figure				
Oval	73	25.6 (3.12)	1.09	0.2
Irregular	7	26 (2.5)		
Margin				
Circumscribed	58	26.66 (4.1)	1.9	0.3
Indistinct	1	24 (0%)		
Angular	4	27.5 (2.8%)		
Microlobulated	7	26.43 (3.7%)		
Spiculated	2	28 (4.7%)		
The nature of the mass				
Simple cyst	3	27.1 (1.1)	1.9	0.3
Solid	70	24.51 (4.1%)		
Solid cystic	4	28.5 (4.1%)		
Cysts containing internal echo	3	26.67 (3.3)		
Mass location				
Far zone	15	25 (4.37)	0.667	0.6
Mid zone	35	25.54 (4.09)		
Near zone	20	24.6 (3.34)		
Retroareolar	5	22.4 (3.3%)		
Intradermal	1	25 (0%)		
Result Pathology				
Benign	18	23.67 (3.72%)	2.916	0.04
Malignant	3	28 (2.6%)		

Table 2: Comparison of sonographic findings in the subjects based on BMI

BMI	Frequency	Mean	Statistics	P
Mass figure				
Oval	79	22.75 (3%)	0.6	0.9
Irregular	1	23 (0%)		
Margin				
Circumscribed	107	27.32 (5.1%)	1.645	0.12
Indistinct	1	21 (0%)		
Angular	2	26.5 (4.8%)		
Microlobulated	6	24.28 (3.2%)		
Spiculated	1	22 (0%)		
The nature of the mass				
Simple cyst	2	21.3 (1.1%)	0.7	0.75
Solid	47	22.62 (4.1%)		
Solid cystic	4	22.82 (2.1%)		
Cysts containing internal echo	3	21.48 (2.5%)		
Mass location				
Far zone	14	22.63 (1.6%)	0.667	0.6
Mid zone	25	22.87 (2.3%)		
Near zone	15	22.28 (3.5%)		
Retroareolar	1	22 (0%)		
Result Pathology				
Benign	14	22.79 (2.4%)	0.289	0.7
Malignant	3	23.26 (3.9%)		

According to the standard sonography report by BIRADS system, the highest frequency belonged to B4a. In the case of follow-up ultrasound, the standard mammography report based

Table 3: Comparison of sonographic findings in the subjects based on marriage

Marital status	Single	Married	P
Mass figure			
Oval	51	22	0.4
Irregular	2	5	
Margin			
Circumscribed	34	24	0.033
indistinct	0	1	
angular	0	4	
microlobulated	2	5	
Spiculated	0	2	
The nature of the mass			
Simple cystic	3	0	0.005
Solid	38	33	
Solid cystic	0	4	
Cysts containing internal echo	0	3	
Mass location			
Far zone	7	8	0.8
Mid zone	16	19	
Near zone	11	9	
Retroareolar	3	2	
intradermal	0	1	
Result Pathology			
benign	9	9	0.5
malignant	1	2	

Table 4: Comparison of sonographic findings in the subjects based on family history

family history	No	Yes	P
Mass figure			
Oval	63	10	0.6
Irregular	7	0	
Margin			
Circumscribed	48	8	0.5
Indistinct	1	0	
Angular	4	0	
Microlobulated	6	1	
Spiculated	2	0	
The nature of the mass			
Simple cystic	2	1	0.25
Solid	60	11	
Solid cystic	4	0	
Cysts containing internal echo	3	0	
Mass location			
Far zone	12	1	0.9
Mid zone	30	5	
Near zone	17	3	
Retroareolar	4	1	
intradermal	1	0	
Result Pathology			
Benign	15	3	0.6
malignant	3	0	

to be lymph node negative. According to the findings of this study, the majority of the masses were benign. The mean age of subjects with malignant mass was significantly higher than individuals with benign mass. The average mass index was not significant according to the findings of the present study. There was a significant relationship between marital status and mass margin and the nature of mass, so that circumscribed margin was the most common among single and married people. No significant relationship was found between family history and sonographic findings.

Various studies have been performed in this regard. The study by Feyzi in Iran (2018) by ultrasound showed that 51 (34%) patients were completely normal, followed by cysts or fibrocystic changes (71%), mass with possibly benign appearance (2.6%), and mass with a possibly malignant appearance (16%).[17]

The study by Hasni *et al.* (2004)[18] also showed that patients were aged 15 to 66 years, most of them were in the third and fourth decades with an average age of 25 years. Moreover, eight patients with proven malignant breast mass were between 39 and 66 years old. These cases had no family history of breast cancer. Only four patients had a family history of breast cancer, and the findings indicated that all breast lesions were benign. Most patients with palpable breast mass were under 40 years of age. Most patients with malignant breast mass were 40 years of age or older. Positive and negative family history of breast cancer was not related to the results. This study was in line with the present study because our result showed that patients with malignant masses had a higher mean age than those with benign masses; most masses were benign (85.7%) and individuals had no family history of cancer.

The findings of Jahan *et al.* (2017)[19] showed that nine (20.9%) cases were diagnosed as malignant and 34 cases (79.1%) were diagnosed as non-malignant. Eight of the nine cases were diagnosed as malignant lesions by ultrasound. Of 34 non-malignant lesions, 32 were histopathologically proven and 2 did not match the sonographic findings.

In Gharekhanloo study, a total of 25 patients had a suspected mass on ultrasound, of which 11 patients (11%) had a definite diagnosis of pathology. The minimum and maximum age of patients were 23 and 31 years, respectively. The mean age of patients was 27.5 years and half of the patients were single. In addition, three patients had a positive family history. The most common type of pathology was found to be invasive ductal carcinoma and grade 3, which was in line with the present study.[20]

Conclusion

In the current study, considering that most of the cases with a feeling of mass in the breast in women under 30 years of age were BIRADS 4, and among the cases that underwent biopsy, 14.5% were diagnosed with cancer pathology. Therefore, ultrasound examination is very important in these cases, even at a young

on the BIRADS system indicated that the highest frequency was related to B3. Also, 8 cases showed a larger mass than before. According to the pathology report, fibroadenoma was the most common. Furthermore, most of the samples were found

age. It is recommended that physicians and healthcare providers in the countries also prioritize the follow-up of young patients with a feeling of mass in the breast.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflicts of interest

There are no conflicts of interest.

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