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.15 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.16 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.17 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. 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%) | 0.3  |    |
| Microlobulated    | 7        | 26.43 (3.7%) | 0.289 | |
| 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%) | 0.667 | 0.6 |
| Solid cystic      | 4        | 28.75 (4.1%) |       |    |
| Cysts containing internal echo | 3 | 26.67 (3.3) |         |    |
| 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 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%) | 0.289 | |
| Microlobulated    | 6        | 24.28 (3.2%) | 0.667 | 0.6 |
| 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%) | 0.667 | 0.6 |
| Solid cystic      | 4        | 22.82 (2.1%) | 0.667 | 0.6 |
| 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%) | 0.667 | 0.6 |
| Near zone         | 15       | 22.28 (3.5%) | 0.667 | 0.6 |
| Retroareolar      | 1        | 22 (0%) |         |    |
| Result Pathology  |          |       |            |    |
| Benign            | 14       | 22.79 (2.4%) | 0.289 | 0.7 |
| Malignant         | 3        | 23.26 (3.9%) | 0.289 | 0.7 |

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
Roostaee, et al.: The relative frequency of ultrasound findings in women

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The findings of Jahan et al. (2017) 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 was 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.

### 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 age.
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.

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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.

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Conflicts of interest
There are no conflicts of interest.

References
1. Snapp C. Diagnostic accuracy of digital mammography is improved in younger women. J Midwifery Womens Health 2021;51:59.
2. Berg WA, Blume JD, Cormack JB, Mendelson EB, Lehrer D, Böhnm-Vélez M, et al. Combined screening with ultrasound and mammography vs mammography alone in women at elevated risk of breast cancer. JAMA 2008;299:2151-63.
3. Ma J, Jamal A. Breast cancer statistics. Breast Cancer Metastasis and Drug Resistance. New York: Springer; 2013. p. 1-18.
4. Smeltzer SC, Bare BG, Hinkle J, Cheever K, Townsend MC, Gould B. Brunner & Suddarth’s Text Book of Medical Surgical Nursing. 10th ed. Philadelphia: Lippincott, Williams & Wilkins; 2004.
5. Das S, Sen S, Mukherjee A, Chakraborty D, Mondal PK. Risk factors of breast cancer among women in eastern India: A tertiary hospital based case control study. Asian Pac J Cancer Prev 2012;13:4979-81.
6. Soltani F, Shobeiri F. Mensatual patterns and its disorders in high school girls. Iran J Obstet Gynecol Infertil 2011;14:28-33.
7. Akbarzadeh M, Shobeiri F, Mahjub H, Ebrahimi R. Investigating the factors influencing the duration of beginning delivery to hospital discharge using cox regression model. Iran J Obstet Gynecol Infertil 2014;17:1-9.
8. Keramatinia A, Mousavi-Jarrah SH, Hiteh M, Mousavi-Jarrah A. Trends in incidence of breast cancer among women under 40 in Asia. Asian Pac J Cancer Prev 2013;15:1387-90.
9. Thangjam S, Laishram RS, Deb Nath K. Breast carcinoma in young females below the age of 40 years: A histopathological perspective. South Asian J Cancer 2014;3:97-100.
10. Thapa B, Singh Y, Sayami P, Shrestha UK, Sapkota R, Sayami G. Breast cancer in young women from a low risk population in Nepal. Asian Pac J Cancer Prev 2013;14:5095-9.
11. Gibbs RS, Karlyn BY, Haney AF, Nygaard I. Danforth's obstetrics and gynecology. Philadelphia: Lippincott Williams and Wilkins; 2008.
12. Azaria A, Mohammadiard M. Analysis of the factors, effective on breast parenchymal density in mammogram. Iran J Obstet Gynecol Infertil 2008;11:9-16.
13. Elmore JG, Armstrong K, Lehman CD, Fletcher SW. Screening for breast cancer. JAMA 2005;293:1245-56.
14. DeSantis CE, Ma J, Goding Sauer A, Newman LA, Jamal A. Breast cancer statistics, 2017, racial disparity in mortality by state. CA Cancer J Clin 2017;67:439-48.
15. Harvey JA, Mahoney MC, Newell MS, Bailey L, Barke LD, D’Orsi C, et al. ACR appropriateness criteria palpable breast masses. J Am Coll Radiol 2016;13 (11 Suppl):e31-42.
16. Rheinbay E, Parasarumaran P, Grimsby J, Tiao G, Engreitz JM, Kim J, et al. Recurrent and functional regulatory mutations in breast cancer. Nature 2017;547:55-60.
17. Feyzi A, Jarahi L, Alamdaran A, Abdollahi A, Abbasi B. Evaluation of breast ultrasonography findings in the women with dense breasts in mammographic screening at Imam Reza Hospital in Mashhad, Iran (2015-2016). Iran J Obstet Gynecol Infertil 2018;21:15-21.
18. Hasni H, Meah FA, Norlia A, Sharifah NA, Zulfiqar A. Ultrasound in the assessment of the palpable breast mass. Med J Malaysia 2004;59:486-94.
19. Jahan AB, Ahmed MU, Begum M, Hossain MM, Rahman MM, Sarwar JM, et al. Ultrasonographic evaluation of palpable breast mass and correlation with histopathology. Mymensingh Med J 2017;26:223-9.
20. Gherekanloo F, Mohammad Gholi Mezerji, Shamsizadeh M. Young women with breast cancer: A cross-sectional descriptive study over 3 years. Sci J Nurs Midwifery Paramed Fac 2019;5:94-105.