

Diagnostic Accuracy of High Frequency Ultrasound and Mammography in Breast Lump

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ABSTRACT

Objective: The study was conducted to evaluate the diagnostic accuracy of high frequency ultrasound and mammography in common breast lumps.

Study Designs: Observational study

Place and Duration: This study was carried at Radiology Department, LUMHS & NIMRA Jamshoro/Hyderabad and Isra University Hospital, Hyderabad from June 2008 to June 2012.

Materials and Methods: A sample of 520 female of age 20 - 80 years presenting with breast lumps after initial examination were evaluated for further benignity or malignancy using ultrasonography and mammography. The findings were then compared with both diagnostic modalities. Data were entered and analyzed by using SPSS 21.0. Continuous and categorical variables were analyzed by student t test and chi square test. A p value ≤ 0.05 was considered statistically significant.

Results: Mean $\pm$ SD of age was noted as 45.69 ± 10.77 years. Most of the patients were married (76.9%) and belonged to middle age group (51.5%). There were insignificant associations observed when we compared the underlying diagnosis with the diagnostic techniques used ($p=0.075$). On the other hand, the diagnosis in young age group was significantly made by using ultrasonography and in older group mammography was the diagnostic modality of choice ($p = 0.020$).

Conclusion: Non-invasive test such as ultrasonography should be the preferred technique in young patients who present clinically with a breast lump.

Key Words: Ultrasonography, Mammography, Breast lump

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INTRODUCTION

Benign or malignant breast lumps are quite common in younger and older women¹ and according to recent 2014 American cancer society estimates, 9 out of every 10th women showing benign tissue changes and about 231,840 new cases of invasive breast cancer and about 60,290 new cases of carcinoma in situ (CIS) are being diagnosed in women and the associated mortality is about 40,290²⁻⁴.

Ultrasound is the investigation of choice in young women with symptomatic breast lumps under the age of 35 years and for different cystic and solid masses and assessment of mammographic abnormalities. Mammography is used for both screening and diagnostic purpose in women aged 50 years and above. Mammography is a special x-ray used to image breast giving high quality image with optimum film density and contrast, high resolution, and low radiation dose³⁻⁵.

Clinical presentations of women with palpable lumps in their breasts are very common worldwide and most of them are generally benign. Three rules for the diagnosis of underlying pathology are very helpful, these are; a complete physical examination, imaging, and sometimes breast tissue is also needed for the definite diagnosis. Fine needle biopsy can also be used to differentiate the cystic or solid masses but for that there must be a trained physician available with adequate experience to perform this procedure.

Mammography screens presence of underlying malignancy in the same and also in the opposite breast in older women; the documented drawback of mammography in younger women is that it is less sensitive in women younger than 40 years. On the other hand, ultrasonography is very helpful in distinguishing cystic masses, which are common, and may be used to guide biopsy techniques. Tissue specimens obtained with core-needle biopsy allow histological diagnosis, hormone-receptor testing, and differentiation between in situ and invasive disease. Core-needle biopsy is more invasive than fine-needle aspiration, requires more training and experience, and frequently requires imaging guidance. After the clinical breast examination is performed, the evaluation depends largely on the patient's age and examination characteristics, and the

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physician's experience in performing fine-needle aspiration⁵⁻¹².

The aim behind this study was to evaluate the diagnostic accuracy of high frequency ultrasound and mammography in common breast lumps.

MATERIALS AND METHODS

The present observational study was carried out at the Department of Radiology, LUMHS & NIMRA Jamshoro/Hyderabad and Isra University Hospital, Hyderabad from June 2008 to June 2012.

A total of 520 female patients presented with masses in the breast between the ages of 20 and 80 years after getting informed consent were included in this study. Patients with clinical breast masses were first examined by gynecologists and after that for further evaluation of benignity and malignancy the masses were then diagnosed using ultrasonography and mammography techniques. If the masses had 3 out of the 7 criteria of malignant masses such as depth, variability, irregularity in echogenic halo, hypogenicity with low-level marked and non-uniformity, the masses were recognized as malignant masses and rest were categorized as benign masses.

A preformed structured questionnaire was used to collect the relevant data such as age, marital status, diagnostic techniques used, and the final diagnosis made after using those modalities.

Data was entered and analyzed by using SPSS 21.0. Continuous and categorical variables were analyzed by student t test and chi square test. A p value ≤ 0.05 was considered statistically significant.

RESULTS

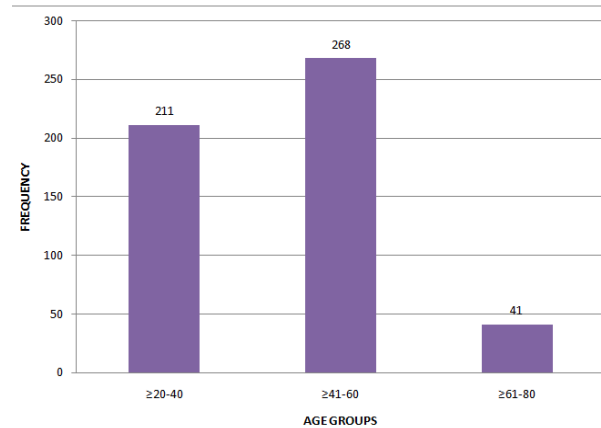
Out of a total 520 patients, the mean age and SD was 45.69 ± 10.77 years and the age ranging between 20 to 80 years. Among them, majority were married as compared with singles, 76.9% and 23.1% respectively (Table 1).

Table 1: Baseline demographic characteristics of study population

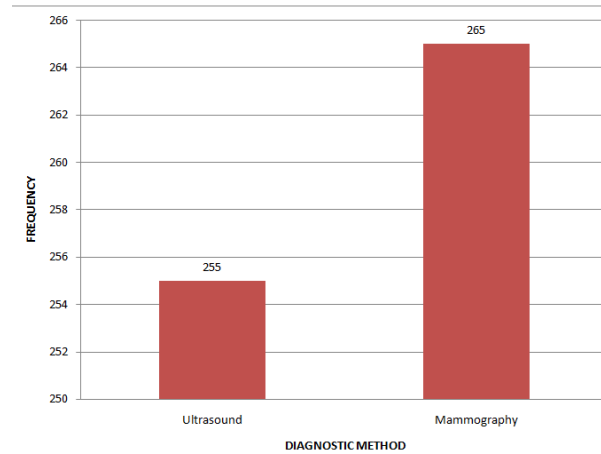
Age - Years		
Mean $\pm$ SD	45.69 $\pm$ 10.77	
Minimum	20	
Maximum	80	
Marital Status	No.	%
Single	120	23.1
Married	400	76.9

Table No.2: Comparison of Diagnostic Methods and Underlying Diagnosis

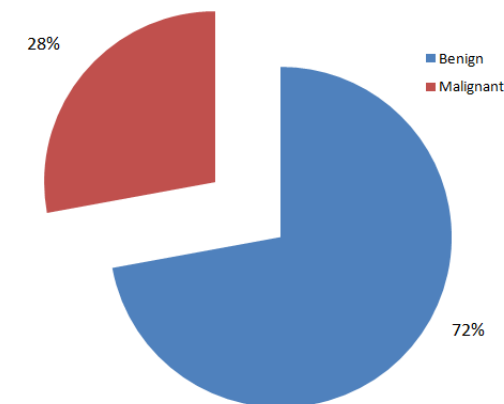
Diagnostic Methods	Diagnosis		P Value
	Benign	Malignant	
Ultrasound	193	62	0.075
Mammography	182	83	



Graph No. 1: Age Grouping of Study Participants



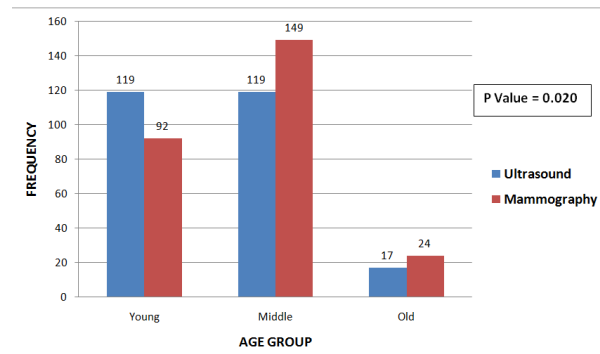
Graph No.2: Diagnostic Modality Used



Graph No.3: Underlying Diagnosis of Patients

The age of the female patients in our study was divided into three main categories. Young age group ($\geq 20 - 40$ years), middle age group ($\geq 40 - 60$ years), and old age group ($\geq 61 - 80$ years). In our study, middle age group comprised of main study participants (51.53%) as compared to young and old age groups (Graph 1). Graph 2 shows diagnostic modalities we have used in our study. Mammography was the most commonly used diagnostic modality (N = 265, 55.38%) as compared with ultrasonography (N = 255, 49.0%). Among them,

benign breast lumps were diagnosed in 72% of the cases and rest of them were malignant, 28% (Graph 3) There were insignificant associations observed when we compared the underlying diagnosis with the diagnostic techniques used (p value 0.075). Table 2. On the other hand, the diagnosis in young age group was significantly made by using ultrasonography and in older group mammography was the diagnostic modality of choice (p value <0.020) (Graph 4)



Graph No.4: Comparison Between Age Groups And Diagnostic Modality Used

DISCUSSION

Breast lumps are the common findings observed in both younger and older women and sometime the initial presentation of malignant breast diseases¹¹. In our study, most of the women presenting with clinically palpable breast lump were of middle age 45.69 years. In a previously conducted study the same findings were observed¹²⁻¹³. Due to non-invasive procedure the ultrasonography was the preferred modality of choice to commence with. Although for the diagnosis of malignant breast diseases mammography is the preferred method but in our study we have found that ultrasonography can detect benign or malignant breast lumps in younger population but as the women ages, mammography will be used to diagnose the underlying pathology involved in causing breast lumps. When the data was compared to observe the diagnostic significance in both techniques, our data has shown no significant difference. That means, for the initial diagnosis of breast lumps non-invasive method such as ultrasonography can be used in younger and older population. A study conducted by Guila has shown that ultrasonography in diagnosing breast lumps was more than 80% sensitive and more than 95% characteristic in differentiating breast lumps¹⁴⁻¹⁵. Previous literature shows that with increasing age, the prevalence of malignant breast diseases also increases, that is why in older females according to the American Cancer Society guidelines, mammography should be done to screen the malignancy¹⁶.

CONCLUSION

The findings show that the initial assessment of young patients who present with clinical breast lump, the ultrasonography is as sensitive and specific as the mammography. However, mammography may be preferred for both screening and diagnosis of benignity and malignancy in women.

Conflict of Interest: This study has no conflict of interest to declare by any author.

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