SONOMAMMOGRAPHY FOR EVALUATION OF SOLID BREAST MASSES IN YOUNG PATIENTS

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Background: This study was carried out to evaluate the applicability of sonomammography as the primary radiological modality in young patients with breast masses. **Methods:** This study was carried out at Radiology Departments of PNS Shifa Karachi and CMH Rawalpindi from February 2002 to April 2005. Sonomammography of 56 young patients with breast lump was done. Lesions were characterised by using sonographic criteria as benign (n=49), malignant (n=2) and intermediate (n=5) masses. Results of this evaluation were assessed by fine needle aspiration cytology. **Results:** No false positive result was noted in 49 benign lesions while only one intermediate mass turned out to be malignant. Sensitivity of sonomammography was more for benign 92% than malignant lesions 67%, and its specificity was high for malignant lesions 92.4%. Retrospective scanning was done for intermediate masses. **Conclusion:** This study proves the efficacy of ultrasound as a method of choice to evaluate breast masses in young patients avoiding the need of biopsy. This study also reflects that benign diseases dominate the disease spectrum in young patients.

Keywords: Sonomammography, benign diseases, young patients.

INTRODUCTION

Evaluation of breast problems in young women is a well-known problem. Many of the young patients present with mastalgia, nodularity or asymmetry,[1] but a small proportion may indeed present with a lump. In contrast to women greater than 35 years, mammography is not indicated in young females because of the low risk of breast cancer, increased risk of radiation induced malignant change and poor image quality due to dense fibroglandular breast tissue.

Ultrasonography (USG) is the ideal imaging modality and can be useful in identifying and characterising breast masses by certain criteria and then guiding further investigations Lot of research has been done on “tripple assessment” of breast diseases in adult females but only few studies have been done on breast diseases in young patients including teenagers.[2,3] The purpose of our study was to evaluate the accuracy and reliability of certain sonographic features to characterize a mass in young patients. These criteria may be helpful to allay the anxiety of breast disease in a young girl in a non invasive way and can also eliminate the need of breast biopsy.

MATERIAL AND METHODS

This study was conducted in Radiology Departments of PNS Shifa Karachi and CMH Rawalpindi, from February 2002 to April 2005.

Sonomammography of 56 patients aged 15 to 25 years was done The inclusion criteria were patients having palpable breast lump, patients having diffuse nodularity and patients having breast lump associated with other symptoms like pain and nipple discharge Patients having unilateral or bilateral symptoms were included in this study.

The exclusion criteria were patients already diagnosed and treated for breast lump, patients with echopenic cystic mass on first ultrasonography, Post-traumatic or post-infective breast swelling and patients with physiological swelling.

A detailed ‘breast specific history’ was taken including menstrual history, history of mastalgia, lactational history, past and family history of any breast problem.

Ultrasonography was routinely performed as an initial imaging examination in all selected patients with a 7.5 MHz probe on ALOKA SSD 1400 and GE LOGIC 500 ultrasound machines. The scanning protocol included both transverse and longitudinal real time imaging of the solid masses.

The guideline criteria laid down by Stavros et al for solid breast masses was applied and sonographic features of the lesions were evaluated to make a final assessment. Cytopathology was done in the form of fine needle aspiration cytology for its being less invasive. Non diagnostic smears were repeated. A needle biopsy results was considered not definitive if the imaging and cytology findings were grossly discordant or if the needle biopsy result indicated insufficient sampling. A standardised final assessment category based on American College of Radiology Breast imaging and Data system was made. Thus the lesions were categorized as benign, malignant, probably benign or probably malignant. The last two categories were grouped into intermediate.[4]

RESULTS

There were 49 masses assessed as benign on ultrasonography and 2 masses assessed as malignant while 5 masses were intermediate. This was done after visualizing different characteristics that are mentioned in table 1

Table-1: USG criteria for differentiation of mass (n=56)

U/S Features		Frequency
Shape	Round or oval	38
	<3 lobulations	14
	>3 lobulations	3
	Irregular	1
Margin	Circumscribed	54
	Microlobulated	0
	Ill defined	1
	spiculated	1
Width AP ratio	> 1.4	54
	≤ 1.4	2
Echotexture	Heterogenous	16
	Intermediate	15
	Homogenous	25
Echogenicity	Hyperechoic	37
	Isoechoic	15
	Hypoechoic	4
Post echo intensity	Enhanced	29
	Unaffected	23
	Attenuated	4
Pseudocapsule	Present	24
	Absent	32
Edge refraction	Present	33
	Absent	23
Calcification	Present	4
	Absent	52

Fine needle aspiration cytology results revealed that 53 masses were benign and 3 masses turned out to be malignant. Final assessment of the lesions were done which is mentioned in table-2 Lesions were characterized as benign (negative or probably benign) or malignant

Table-2: Distribution of masses (n=56)

	Benign	Malignant	Intermediate
USG Features	49	2	5
FNAC	53	3	0

It was observed that fibroadenoma headed the diagnostic list in all age groups including 3 giant fibroadenoma. Cytopathology revealed the diagnosis of fibrocystic disease in 6 patients having diffuse nodularity on clinical examination and ill defined solid and cystic masses on ultrasonography. The patients diagnosed to have malignant lesions were confirmed with core needle biopsy or excision biopsy The 3 cases were 2 intraductal carcinoma and 1 medullary carcinoma. The distribution of cases according to disease pattern is shown in table 3.

Table-3: Pattern of diseases (n=56)

Diagnosis	No of patients
Fibroadenoma	43
Giant fibroadenoma	3
Fibrocystic disease	6
Lipoma	1
Intraductal carcinoma	2
Medullary carcinoma	1

The ultrasound features most predictive of benign tissue diagnosis were oval or round shape (38masses), circumscribed margins (54masses) and width to AP ratio >1.4 (54masses) The features most predictive of malignant masses were spiculated or microlobulated mass (1 mass), irregular shape (1mass), ill defined margins (1mass),and width to AP ratio <1.4 (2masses)

Some features were not reliable in differentiating between malignant and benign lesion .For example the effect of mass on posterior echo intensity was not a useful determinant (23 masses unaffected).

Some features which might show excellent correlation with a benign or malignant mass were not always present (infrequent) for example a hyperechoic lesion suggest benign pathology but one malignant lesion was hyperechoic.

Based on the final assessment criteria statistical analysis of the data was done Separate analysis was done for detection rate of benign and malignant masses. Data was analysed by SPSS Version -10.

Chi-square test of significance was done and significance of test was taken at <0.05.The sensitivity of ultrasonography for breast masses was 92% for benign and 67%for malignant lesions Its specificity was high for both i.e 92.4%. Since there were no false negative or positive results rather only intermediate masses, accuracy of ultrasound was 91%**.**

In the presence of most reliable 3criteria ultrasonography could diagnose breast lesion accurately. To make our study more precise retrospective analysis of 5 intermediate cases was done The evaluating criteria were revised in these patients. This study reflects the diagnostic yield for breast lesions.

DISCUSSION

The spectrum of breast diseases is different in young females, and what brings a young girl to doctor is no more than Anomaly of Normal Breast Development and Involution (ANDI). The term ANDI implies that

most breast disorders are only physiological extremes.[5,6] Ultrasonography is of great value for breast disease detection in young. Previously the use of ultrasonography was restricted to differentiation of cystic and solid masses. Today ultrasonography can be used to further characterise a lesion and to guide interventional procedures.[7,8] In addition, the role of ultrasonography in differentiating benign and malignant lesion is still evolving. It is pertinent to mention that lesions in young patients are more conspicuous on ultrasonography than mammography in the background of dense parenchyma.[9-11]

In our study we included clinically positive cases only, so our study did not address detectability. Stevros et al described specific ultrasound features to differentiate between benign and malignant lesions.[12] In this study we investigated the general applicability of these criteria to differentiate the breast lesions in young patients who have different disease spectrum. In a scientific exhibit at RSNA 1999 scientific assembly ultrasound was evaluated as an ideal modality in children with breast symptoms and various features were described to asses breast lesions in teenagers. In our study we analysed that only those features were helpful which were not only reliable but were also frequently present. Less specific features were pseudocapsule, edge reflection, posterior attenuation and hypoechoic texture which had equal frequency in both benign and malignant masses. Overall, the most reliable predictors of malignancy were shape, margins and width/AP ratio .and least useful features were presence of pseudocapsule or calcification due to their unequal presence in a specific disease.

The sensitivity of ultrasonography for breast masses was more for benign 92% lesions. For malignant leisions its specificity was high but sensitivity was 67%.These were comparable with international studies In a study conducted at Royal South Hampshire Hospital Southampton UK the sensitivity of ultrasonography was 65% for breast cancer in young patients and was lesser than fine needle aspiration cytology (76%).[13]

Our study had few limitations. The sample size was small because of the deliberate restriction in case selection in a specific age group and that too for a specific problem. Second was an unavoidable bias towards benign pathology in younger age group.

The 82% patients in our study had fibroadenoma. In a study conducted at University School of Medicine in Atlanta, 128 patients under 20years were biopsied and 71%had fibroadenoma with peak age at 18 years Another data in American Medical school revealed this incidence to be 77%, This was an important aspect of our study that fibroadenoma is the most common mass in young patients.[14,15] This could help eliminate the need of biopsy in all patients of younger age group especially the teenage group in whom there is increased risk of deformity.[16] Fibrocystic disease was detected in 6 patients after the age of 20 seen as having solid and cystic masses.In a similar study conducted in all females >11years, spectrum of benign breast disease was studied in Pakistani population and fibrocystic disease headed the diagnostic list.[17]

Finally the results of our study were encouraging in that we were able to identify the most applicable ultrasound features for differentiation between benign and malignant masses.[18-20] These features have the potential to decrease the need of biopsy in young patients.and eliminate the fear associated with a breast disease.[21-23]

CONCLUSION

Most breast masses are benign in young females. Fortunately very few have breast cancer. Despite this most women with breast complaints “assume the worst.” To help allay this fear a simple and safe diagnostic mean must be available. Sonomammography describes reliable features for differentiating benign from malignant masses. These criteria are reliable, frequent and reproducible and have more accuracy for benign lesions than malignant**.**

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