ORIGINAL ARTICLE

Validity of Ultrasound in Diagnosis of Breast Mass in Relation with Fine Needle Aspiration Cytology

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ABSTRACT

Aim: To evaluate the validity of ultrasound in patients with breast mass
Methods: This cross-sectional study was conducted at Radiology Department Combined Military Hospital, Quetta from March 2007 to November 2007. Fifty cases of diagnosed breast mass referred by clinicians were included. Ultrasound finding of breast mass was done and then correlated to fine needle aspiration cytology. The sensitivity and specificity was determined.
Results: There were 32 (64%) cases of benign and 18 (36%) of malignant on ultrasound. Out of benign lesions, only 2 were actually malignant on fine needle aspiration cytology. Thus a total of 20 (40%) were proved to be malignant and 30 (60%) lesions were benign. The sensitivity of benign lesion is 88.88%, specificity 93.75% and overall accuracy rate was 92%.
Conclusion: Ultrasound of breast is an easily available diagnostic modality in evaluating breast lumps. It is non-invasive cheap and cost-effective investigation. Its diagnostic role is further increased when combined with clinical and physical evaluation followed by fine needle aspiration cytology. This will relieve the anxiety of patients and will reduce the number of biopsies.
Keywords: Breast, Ultrasound, Fine needle aspiration cytology (FNAC), Benign breast lesion

INTRODUCTION

Mammary glands have physical as well as psychological importance in human females and 12.5% (1 in 8) women have life time threat for increasing breast cancer by the age of 85 years[1]. The casualty of breast cancer increased about 4% per annum in 1980s.[2] Breast cancer is the most commonly diagnosed malignancy and a key factor of cancer mortality among women.[3] Breast lump is the clinical presentation of numerous breast disorders ranging from innocent benign cyst to malignant neoplastic lesion.[4] Breast cancer is the most feared disease by women all over the world and it is the most common female malignancy. Breast is the most common organ for cancer worldwide and in Pakistan.[5] Just about one in each nine Pakistani women is probably going to suffer from breast cancer which is one of the most elevated rates in Asia.[6] Its incidence is raising worldwide most probably due to increase in the aging population and means for early detection like FNAC.[7] Breast cancer is also one of the leading causes of death among the females world over[8,9]. No cancer is more feared by women than carcinoma of breast and for good reason. It is most common malignancy of female in USA and probably all over the world[10]. However more recently there has been an increase in the incidence of breast cancer in the developing countries[11].

The epidemiology of breast cancer in Pakistan is hard to depict because of an absence of tumor registry system in Pakistan. In 1989, a retrospective review of cancer data from 4 different hospitals in Lahore, Pakistan have shown breast cancer to be the most frequent cancer over all in that study[12]. Fine needle aspiration cytology was adopted as a routine diagnostic procedure by Martin and Ellis in 1926 at Memorial Hospital, New York.[13] Fine needle aspiration cytology is less invasive technique of obtaining a cell diagnosis and very accurate, if both operator and cytologist is expert. Fine needle aspiration cytology is also less painful, outdoor procedure in which general anesthesia is not required and it can be repeated safely. Fine needle aspiration cytology has minimal complications like infections, hemorrhage implantation of cells and vascular dissemination of tumour cell.

The purpose of this study is to identify the breast lesions by the non-invasive mode of imaging and this study will decrease the number of biopsies, cost of screening and morbidity for benign masses by reliable identification of sample cysts.

PATIENTS AND METHODS

This cross-sectional study was conducted at Radiology Department Combined Military Hospital, Quetta with the help of Department of Pathology from March 2007 to November 2007 and comprised 50 cases of diagnosed breast mass. The female patients age between 16 to 65 years presenting with breast lumps were included. Patients with diagnosed breast lesion on histopathology, fungating mass and acute inflammatory conditions were excluded. Ultrasound finding of breast mass was done and then correlated to fine needle aspiration cytology. A needle of 22g on a 20 cc syringe was used. The site was cleaned with spirit swab. Lumps were located and fixed with indexed finger and thumb of left hand. While the plunger retracted, many passes with needle were made in the needle was then withdrawn after slow release of the plunger, and needle detached. Air was suctioned in the syringe and in the wake of joining the needle once more, the suctioned material was showered on the glass slide

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and spread made. The spread was settled with 95% liquor and later recolored with hematoxylin and eosin stain. The slides were studied under light microscope by histopathologist. Data was analysed by using SPSS-20. Sensitivity and specificity analysis was done for the finding of both screen tests.

RESULTS

The patient's ages ranged from 16 to 65 years with mean age of 49 years (Table 1). There were 32 (64%) benign cases and 18 (36%) malignant found on ultrasound. Out of benign lesions on ultrasound (n=32), only 2 were actually malignant on FNAC. Thus a total of 20 (40%) lesions were proved to be malignant and 30 (60%) lesions were benign on FNAC. The sensitivity of ultrasound din ruling out a benign lesion is 88.88% specificity 93.75%, PPV of 88.88% and NPV of 93.75%. The overall accuracy was 92%. Ultrasound diagnostic report showed that there were 32 (64%) cases found to be benign and 18 (36%) cases were diagnosed malignant. Gold standard criteria of FNAC diagnosis confirmed that actually 30 (60%) cases were benign and 20 (40%) patients had malignant lesions (Table 2).

Table 1: Frequency and percentage of age

Age (years)	No.	%
15 – 30	20	40.0
31 – 50	22	44.0
51 – 65	8	16.0

Table 2: Comparison of ultrasound vs fine needle aspiration cytology results

Ultrasound	ESWL		Total
	Malignant	Benign	
Malignant	16	2	18
Benign	2	30	32
Total	18	32	50

$$\text{Sensitivity} = \frac{16}{16 + 2} \times 100 = 88.88\%$$

$$\text{Specificity} = \frac{30}{30 + 2} \times 100 = 93.75\%$$

$$\text{Accuracy} = \frac{16 + 30}{16 + 30 + 2 + 2} \times 100 = 92\%$$

DISCUSSION

The ultrasound plays important role in the diagnosis of cyst characterization of masses that are in completely assessed or obscured by dense tissues on mammography and provide image controlled guidance for percutaneous biopsy and localization. Breast ultrasound is the most important modality after mammography. Its indications include symptomatic breast lumps in women <35 years, circumscribed mass seen on mammography, breast lump developing during pregnancy or lactation, the augmented breast. Breast inflammation and breast lump in a male.[14]
The sonographic finding with highest positive predictive value for malignancy is speculations. It represents tumour tentacles or desmoplastic reaction. Sonographic speculations consists of straight lines that radiate perpendicularly from the surface of the mass. Benign features included absence of any malignant feature plus markedly hyperchoic textures, ellipsoid shape, well circumscribed lobulations and thin echogenic pseudocapsule[15].

Fine needle aspiration cytology is characterized as utilizing a fine needle to expel an example of cells from a suspicious mass for demonstrative purposes.[16] Fine needle aspiration cytology is viewed as a negligible obtrusive, cost effective method with diagnostic accuracy within 90-99%. Fine needle aspiration cytology has minimal complications like infection hemorrhage, implantation of tumour cells and vascular dissemination of tumour cells. It can be repeated safely if cytology is inconclusive. The diagnostic sensitivity and specificity relies upon a few variables including the site and type of lesions; the experience of the aspiratory, the nature of the specimen arranged and the symptomatic abilities of the cytopathologists.[17] Fine needle goal cytology turned out to be less expensive, quicker and fairly more sensitive and superior than the standard core needle biopsy.[18] It ought to be the diagnostic technique of the choice for solid palpable breast tumour and by utilizing it as the underlying diagnostic procedure in those patients, it is conceivable to stay away from open biopsy and go straightforwardly to complete treatment.[19]

CONCLUSION

Fine needle aspiration cytology is most accurate if FNAC along with one of the other diagnostic modality (ultrasound) is combined. However in cases where FNAC is suspicious but other variables are benign open biopsy needs to be done for definite preoperative diagnosis. As a single procedure its sensitivity and specificity falls too low to be utilized for definite therapy. However it does play significant role in collaboration with ultrasound and FNAC. Ultrasound and FNAC are acute, quick and cost-effective methods for the diagnosis of breast lump and alternative of open biopsy.

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