Original Article

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Fine-Needle Aspiration Cytology of the Palpable Breast Lump of 106 Cases and Correlation with Histologic Diagnosis: A Prospective Analysis

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Abstract

Aim: Benign as well as breast lesions are quite common in the Indian population. It is the second most common cancer after cancer cervix. Fine-needle aspiration (FNA) provides rapid, accurate diagnosis, serve a cost-effective triage role in the treatment of breast masses and provide psychologic relief of anxiety for a patient with benign breast lesion. To study the frequency of various breast lesions on FNA in a tertiary care center and its histopathological correlation.

Materials and Methods: This was 1-year prospective study carried out from August 2014 to July 2015. Physical examination of breast masses by palpation was done. Smears were stained with hematoxylin and eosin stain.

Results: Of the 106 cases, 54 were in the benign category and 52 were in the malignant category. On the histological correlation of 54 cytological benign cases, 52 were confirmed as benign breast lesion while 2 turned out to be malignant. Similarly, 52 cytological malignant cases, 50 were confirmed as malignant but 2 turned out to be benign. FNA was 96.15% sensitive, 96.29% specific in diagnosing malignant lesions.

Conclusion: The diagnostic accuracy of cytology and mammography is consistently correlated with the histopathology and clinical outcome by the ongoing medical audit. The clinical breast examination and mammography screening in female should be encouraged in developing countries from the third decade onward for early detection of breast carcinoma.

Key words: Benign lesion, Fine-needle aspiration cytology, Histopathology, Malignant lesion

INTRODUCTION

Breast cancer is the most common malignant tumor in women globally. In the USA, approximately 232,670 new cases were diagnosed and 40,000 deaths recorded in 2014, contributing to a significant proportion of health care spending.[1] It is the second most common cancer after cancer cervix in Indian females. Currently, 75,000 new cases of breast cancer are detected in India yearly.[2] The Nottingham Grading System is derived by scoring tubule formation, nuclear pleomorphism, and mitotic frequency.[3] Of all epithelial malignancies of the breast, upto 80% breast carcinoma fall into infiltrating ductal carcinoma (IDC) of no special type category.[4] Invasive lobular carcinoma is the second most common histological type of breast cancer, accounting for about 5-15% of cases.[5] The percentage of errors in the cytological diagnosis of lobular carcinoma ranges from 4% to 60% in different series.[6] In combination with mammography/ultrasonography and clinical examination, fine-needle aspiration (FNA) forms a diagnostic triad, which has approximately 100% accuracy.[7] FNA has become widely accepted as a reliable diagnostic tool with high sensitivity and specificity with a minimal rate of complications.[8] FNA cytology is highly sensitive (65-99%) and specific (96-100%).[9] A breast mass is generally palpable when it exceeds 2 cm in size. The likelihood of a palpable mass being malignant increases with age. Only 10% of breast masses under the age of 40 are malignant compared to 60% of masses over the age of 50 years.[10]

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Aim and Objective

To assess the cytological findings from FNA of breast lesions with conventional smear and its histopathological correlation.

MATERIALS AND METHODS

This 1 year prospective study was conducted on 280 cases attending surgical out patient, department of surgery, during the period from August 2014 to July 2015. The histopathology follow-up of 106 cases was available as only these patients underwent surgery. Appropriate approval of the Institution Ethical Committee was obtained for the same. Informed written consent from each patient was also obtained. The subjects concerned included all the patients who were referred to the Department of Pathology for FNA of a breast mass. The physical examination of the breast mass by palpation was done.

The aspirations of the breast masses were performed with 22- or 25-gauge needles attached to a 5 ml or 10 ml syringe in which non-guided FNA was in 105 cases and guided FNA was in 1 case. One or two passes were taken to obtained adequate material, and 5-7 slides were prepared. The materials collected were smeared directly onto slides, fixed with alcohol, and stained by hematoxylin and eosin (H and E) stain. Tumor typing and grading were done according to the Robinson's cytological grading.

Histopathological Examination

Trucut biopsy (9%), biopsy (10.86%) lumpectomy specimen (47.16%), and radical mastectomy(33%) well-preserved formalin fixed specimens received from the Department of Surgery. The paraffin embedded and formalin-fixed sections were stained by routine H and E staining. The sections were studied for the tumor type and grading using the Nottingham modification of Bloom-Richardson system of grading. The smears and the histopathology tissue sections were evaluated separately. Cytological and histopathological correlation were made.

Inclusion Criteria

Age of patients of 15-75 years with palpable lump irrespective with sex.

Exclusion Criteria

Age of patient of below 15 and above 75 years diagnosed cases of breast lesion, recurrence of malignancy, pregnant patients.

The statistical analyzes were done to find the ability of FNA to detect the presence of malignancy in the breast in comparison to histopathology. For this sensitivity, specificity, positive and negative predictive value, and accuracy/efficiency were calculated.

RESULTS

During the study period, out of 280 cases, 106 (37.5%) cases were correlated with histopathological findings. Age of patients ranged from 15 to 75 years. 99.05% were female, and 0.95% were male. 52% right breast, 46% left breast, and 2% bilateral breast lumps with the majority were over upper outer quadrant. The 46.22% had benign lumps, and 38.67% had malignant lumps were concordance to histology diagnosis.

The cytological spectrum of various palpable breast lesions in the present study shows that out of the total 106 cases, 54 were in the benign category, 4 were in the atypical category, 3 were in the suspicious category, and 43 belonged to the malignant category while the cytology study of 2 cases was unsatisfactory (Table 1).

The cytological spectrum of various benign breast lesions encountered in the present study shows that out of the total 54 cases that could be satisfactorily labeled as benign in the present study, fibroadenoma accounted for 44 (41.5%) cases, fibrocystic disease, and proliferative breast disease with atypia 4 (3.77%) each, fibroadenosis and benign proliferative disease 3 (2.83%) each.

On the other hand, the cytological spectrum of various malignant breast lesions encountered in the present study shows that out of the total 43 cases that could be satisfactorily labeled as malignant, IDC accounted for 41 (38.67%), suspicious accounted for 3 (2.83%) cases, lobular carcinoma, and malignant phyllodes 1 (0.94%) case each. Cancers of the male breast, on the other hand, is quite rare and comprises male to female ratio 1:51 of malignant tumor in the present study. Benign lesions were seen in the age-group of 15-60 years; whereas suspicious and malignant cases are seen in the age-group of 29-75 years.

Total number of 106 cases of FNA cytological study of breast lesions were histological correlated. Out of 54 cytological benign cases, 52 were confirmed as benign on histology, but 2 turned out to be malignant. All 4 cytological atypical cases and 3 suspicious cases were confirmed as malignant. Out of 43 cytological malignant cases, 41 cases were confirmed as malignant, but 2 turned out as benign while in all 2 cytological unsatisfactory cases were malignant histology (Table 2).

The histological correlation with benign lesions on cytology as seen in the present study indicated that out of the total 44 (41.5%) cases of fibroadenoma that had a histological correlation, 43 (40.56%) were confirmed as fibroadenoma and 1 (0.94%) was found to be IDC. Of the 4 (3.77%) cases of fibrocystic disease that had a histological correlation were confirmed as fibrocystic

Table 1: Cytological spectrum of various palpable breast lesions

Year	Benign	Atypical	Suspicious	Malignant	Unsatisfactory	Total
11-20	19					19
21-30	25	1		3		29
31-40	4	2		14		20
41-50	5			13	1	19
51-60	1		3	9	1	14
61-70		1		3		4
>70				1		1
Total	54	4	3	43	2	106

Table 2: Comparative analysis of FNA and histological diagnosis of breast lesions

Cytological diagnosis	Number of cases	Histological diagnosis Concordance	Histological diagnosis Discordance
Fibroadenosis	3	1	2 Fibroadenoma
Fibrocystic disease	4	3	1 IDC
Benign proliferative disease	3	2	1 benign phyllodes
Proliferative disease with atypia/indeterminate	4	0	3 IDC 1 lobular carcinoma
Fibroadenoma	44	43	1 IDC
IDC	41	37	1 fibroadenoma 1 benign proliferative disease 2 lobular carcinoma
Lobular carcinoma	1	0	1 IDC
Malignant phyllodes	1	1	0
Suspicious/probably malignant	3	3 IDC	0
Unsatisfactory	2	0	2 IDC
Total	106	92	14

IDC: Infiltrating ductal carcinoma, FNA: Fine-needle aspiration

disease in 3 (2.83%) cases, while 1 (0.94%) turned out as IDC. Of the 3 (2.83%) cases of benign proliferative disease that had a histological correlation, 2 (1.88%) were confirmed as a benign proliferative disease, while 1 (0.94%) was labeled as benign phyllodes. Out of 3 (2.83%) cases of fibroadenosis that had histological correlation, 1 (0.94%) were confirmed as fibroadenosis, while 2 (1.88%) turned out as fibroadenoma. FNA smears in these cases had low cellular yield and showed few small cohesive sheets of ductal epithelial cells with occasional myoepithelial cell in clusters and few small bare nuclei.

The histological correlation with malignant lesions on cytology as seen in present study indicated that out of the total 41 (38.67%) cases of IDC that had a histological correlation, 37 (34.9%) were confirmed as IDC and 2 (1.88%) were labeled as lobular carcinoma, one each (0.94%) was found to be due to benign proliferative disease and fibroadenoma, respectively. The single case of lobular carcinoma turned out to be IDC. Lobular carcinoma was often under diagnosed on FNA. The solitary case of malignant phyllodes (100%) on cytology was confirmed to be true on histology, with presence of metastasis on gluteal region. Due to the malignant and metastatic behavior of malignant phyllodes was made ease to diagnosed on cytology while benign phyllodes were overlap with other benign disease of breast.

On the other hand, the cytological spectrum of unsatisfactory smear in 2 (1.88%) cases was diagnosed as IDC on histology.

In 15.09% of FNA smears were discordance to histological diagnosis. Triple test definitely reduces the rate of inadequate aspiration.

Statistical Analysis of FNA as a Diagnostic Test

FNAC was 96.15% sensitive, 96.29% specific, 96% positive predictive value, 96.29% negative predictive value, 3.48% percentage of false positive, 3.7% percentage of false negative value, and 96.22% efficiency of the study. The *P* value is significant at $P < 0.01$ (SOCSCI statistic software used for calculation).

DISCUSSION

In the present study, age of the patients ranged from 15 to 75 years similar age-group 17-72 years was observed by Chandawale *et al.*[11] in 2014, age-group 10->50 years by

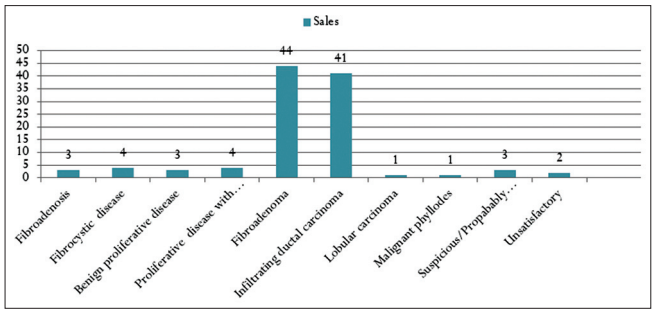

Figure 1: Maximum number of fibroadenoma for 44 (41.5%) cases in benign lesions and infiltrating ductal carcinoma for 41 (38.67%) in malignant lesions in cytological cases

Figure 2: Maximum number of fibroadenoma for 46 (43.39) cases in benign lesions and infiltrating ductal carcinoma for 48 (45.28%) in malignant lesions in histological cases

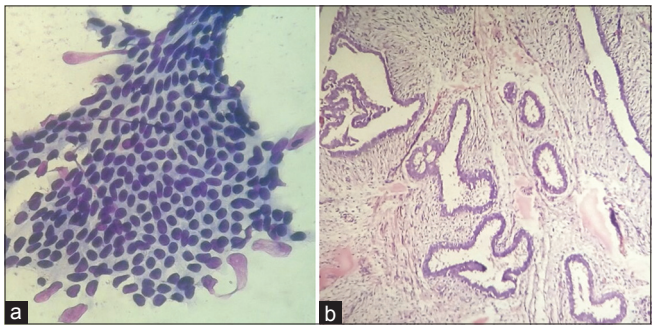

Figure 3: (a and b) Cytological smear of fibroadenoma shows the typical appearance of cohesive benign epithelial cells with admixed myoepithelial cells (H and E, ×40) and fibroadenoma of histology (H and E, ×40)

Likhar *et al.*[12] in 2013, age-group 22-75 years by Eleuterio *et al.*[13] 2015.

In present study, out of benign breast lesions, fibroadenoma 46 (43.39) was most frequently diagnosed lesions similarly 45.91% reported by Likhar *et al.*[12] in 2013, 46.56% by Sankaye *et al.*[14] in 2014, 46.27% by Chandawale *et al.*[11]

In the present study, fibroadenosis was 1 (0.94%) by Likhar *et al.*,[12] in 2013, reported 20%.

In the present study, fibrocystic disease were 3 (2.83%) by Likhar *et al.*,[12] in 2013, reported 12.73%, by Sankaye *et al.*,[14] in 2014, was 24.43%.

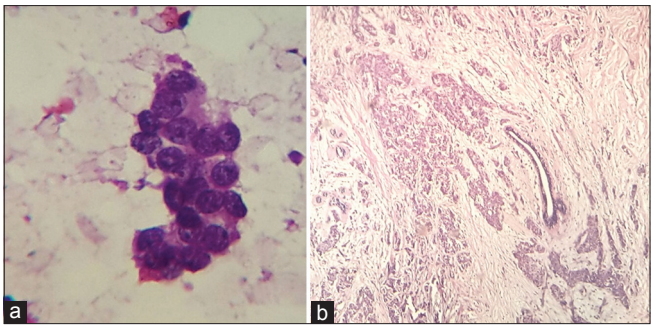

Figure 4: (a and b) Cytological smear of classical infiltrating ductal carcinoma (IDC) shows discohesion and moderate nuclear pleomorphism, prominent nucleoli (H and E stain, ×40) and IDC of histology (H and E stain, ×10)

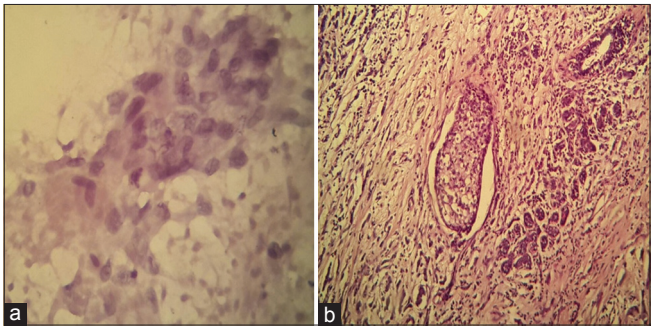

Figure 5: (a and b) Cytological smear of lobular carcinoma shows minimal atypia of the cells and sparse cellularity (H and E stain, ×40) and lobular carcinoma of histology (H and E, ×10)

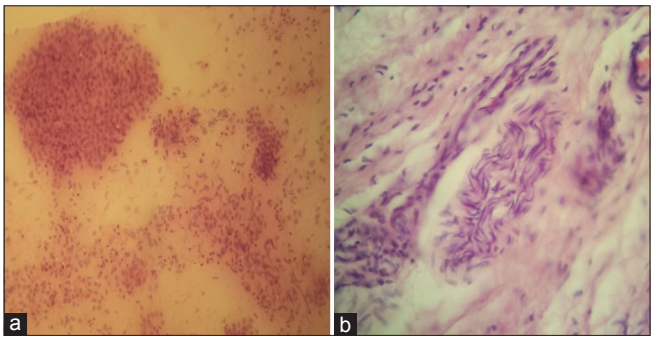

Figure 6: (a and b) Cytological smear of malignant phyllodes shows hypercellular atypical stromal cells and nearby cluster of benign ductal cells (H and E stain, ×10) and malignant phyllodes of histology (H and E stain, ×10)

In the present study, observed benign phyllodes and malignant phyllodes 1 (0.94%) case each, respectively. By Likhar *et al.*,[12] in 2013, phyllodes were reported 1.36%.

In the present study, out of 52 malignant lesions, IDC 50 (47.16%) were a most common diagnosis, fibrocystic disease may mask an adjacent carcinoma, or this may be due to FNA done from the non-representative area. Similarly, 88.60% reported by Sankaye *et al.*,[14] in 2014, 78.57% reported by Likhar *et al.*[12] in 2013.

In the present study, lobular carcinoma were often under diagnosed on cytology, but lobular carcinoma 3 (2.83%) was diagnosed on histology. By Sankaye *et al.*,[14] in 2014, reported 1.53% case and by Likhar *et al.*,[12] in 2013, reported 4.76% cases of lobular carcinoma. Crasta *et al.*,[7] in 2005, reported that 27% were reported as lobular carcinoma 27% were IDC, and 46% were diagnosed as a fibrocystic disease on histology, but all were diagnosed as lobular carcinoma on cytology. Mucha Dulwith *et al.*,[15] 2015 reported cytological diagnosis, 5.1% were benign 30.5% were indeterminate/atypical, 1.7% suspicious all were diagnosed as lobular carcinoma on cytology.

Correlation of cyto-histological findings was 84.90% in the present study. Handa *et al.*,[16] in 2015, cyto-histo correlation reported 78%.

In the present study, FNA was 96.15% sensitive and 96.29% specific, similarly Sankaye *et al.*[14] in 2014 quoted 88.37% sensitive and 96.42% specific in diagnosing malignant lesions. Furthermore, in the present study, FNA had positive predictive value of 96%, negative predictive value 96.29%, and efficiency of the study 96.22%, while Sankaye *et al.*[14] in 2014 reported the positive predictive value of 97.43%, negative predictive value of 84.37% and efficiency of the study of 91.54%. (Figures 1-6)

CONCLUSION

FNA is a valuable diagnostic tool in conjunction with radiological and clinical data of palpable breast lesions. FNA is useful in diagnosis and further planning of treatment without the need for biopsy. Breast cancer is the most common cancer in women after cancer cervix. So that, in developing countries like India, there is a great need for the mass screening program. We recommend multiple clinical set ups with these facilities to be available to all and Government should be providing funds.

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