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Research Paper

Palpable Breast Lumps Fine Needle Aspiration Cytology & Histopathological Correlation by United Kingdom National Health Service Breast Cancer Screening Programme.

Medical Science

KEYWORDS : Breast lumps; fine needle aspiration cytology, histopathology.

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ABSTRACT

Background: *Fine needle aspiration cytology (FNAC) for the diagnosis of lump breast has been proved as a simple, rapid and economical Procedure.*

Aims: Present study was undertaken to evaluate palpable breast lumps fine needle aspiration cytology & histopathological correlation by UNITED KINGDOM NATIONAL HEALTH SERVICE BREAST CANCER SCREENING PROGRAMME (UKNHSBCSP).

Material and methods: *The study was conducted in Department of Pathology, PSMC, Karamsad, Gujarat, over a period of 2 years. A total of 66 cases of breast lump for which FNAC was done with histological follow-up were included in the study. Breast aspirates were provisionally diagnosed based on United Kingdom National Health Service Breast Cancer Screening Programme.*

Results: *Efficacy of FNAC to determine malignant lesions in our study showed a sensitivity of 91.3%, specificity of 100%, diagnostic accuracy of 96.5%, positive predictive valve of 100% and negative predictive value of 90.7%.*

Conclusion: *FNAC was found to be safe, easy, cheap and accurate and could be a good alternative to open biopsy.*

Introduction

Fine needle aspiration cytology (FNAC) is widely accepted as a reliable technique in the initial evaluation of palpable breast lumps. The procedure is simple, safe, cost effective, minimally invasive, rapid and as sensitive as biopsy[1-3].

The scope of cytology now extends into identifying the subtypes of malignant lesions, benign lesions, and minimal residual disease for the purpose of planning the therapeutic protocol and eventual follow-up. Thus, it plays a major role as an important preoperative assessment along with clinical and mammography examination, which together are frequently referred to as "Triple test".[4-6]

This study was carried out not only to highlight the merits and demerits of FNAC but also compare the result of FNAC in palpable lump breast with post operative histopathology reports and so as to find out its accuracy in our setup.

MATERIALS AND METHODS

Material for this study was obtained over a period of two years (2009 – 2011) from the department of Pathology, Shri Krishna Hospital and Pramukhswami Medical College, Karamsad. Majority of the aspirations were performed in the department itself by cytopathologists. Prior to aspiration, detailed history with physical examination of both the breasts and the mass were carried out to assess its size, mobility, and evidence of clinical signs of malignancy.

Fine needle aspiration was done with a 21- or 22-gauge needle attached to a 10 cc disposable syringe. The specimen was taken with minimum passes (to minimize hemorrhage) without needle withdrawal and under constant negative pressure. Samples were smeared onto glass slides and fixed as necessary. Wet-fixed smears were stained with Hematoxylin and Eosin (H and E) and Papanicolaou stain, while air-dried smears were stained with May-Grónwald-Giemsa (MGG) stain.

Amongst a total of 150 patients with palpable breast lumps who underwent FNAC during the study period, 66 breast aspirates with follow-up excision biopsy/lumpectomy/mastectomy formed the crux of the study. Each slide was reviewed by cytologists. The aspirates were evaluated according to United Kingdom National Health Service Breast Cancer Screening Programme (UK-NHSBSP): 5 Tier Reporting Scheme for breast pathology[7] and lesions were categorized into five categories as follows:

C1: Inadequate / Non diagnostic- Acellularity, presence of only blood, fat, bipolar nuclei and macrophage, a too few epithelial groups.

C2: Benign- Includes normal breast and benign lesion from mastitis to fibroadenoma.

C3: Atypical probably benign - Predominantly benign pattern with atypical features either nuclear enlargement or pleomorphism.

C4: Suspicious probably malignant - Limited cell discohesion, minimal nuclear pleomorphism. Bipolar nuclei in the background. Caution to be exercised of lesion reported as suspicious.

C5: Malignant included epithelial and metastatic tumors to breast. Nuclear pleomorphism, abnormal nucleoli, irregularity of nuclear margin.

Low grade: Mild to moderate pleomorphism.

High grade: Marked nuclear pleomorphism – many mitoses often bizarre.

After tabulation of data, the sensitivity, specificity, positive and negative predictive values, false negative rate, false positive rate, and diagnostic accuracy were determined for the types of lesion and whether the FNAC results agreed with the histopathological findings of the excisional biopsy.

RESULTS

Sixty six breast aspirations (age range, 21-90 years with mean age of 48 yrs; side, left breast [53.8%] > right breast [40.6%]) with histological confirmation were observed. Correlation of Cytological and histopathological diagnosis was done as shown in Table 1 and 2.

Category I (Inadequate/Non diagnostic): We confirmed for all our non conclusive and insufficient cases (3 cases, 4.6%) by histopathologic examination. One case turned out as malignant (medullary carcinoma) in which cytosmears were paucicellular and the other 2 cases confirmed as fat necrosis in which cytosmears showed presence of only blood, fat and few bipolar nuclei.

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Category II (Benign): There were 13 cases diagnosed cytologically as Category II, all were compatible with the histological diagnosis. Commonest amongst benign lesions were fibroadenomatoid hyperplasia and granulomatous mastitis followed by acute mastitis and fibroadenoma.

Category III (Atypical probably benign): There were 9 cases diagnosed cytologically in this Category, 7 cases were diagnosed as benign but 2 cases turned out to be malignant on histopathology. One was typed as ductal carcinoma (NOS) and the other one was invasive lobular carcinoma.

Category IV (Suspicious, probably malignant): There were 4 cases diagnosed cytologically in this category. A case of fibrocystic disease with focal atypical duct hyperplasia was diagnosed suspicious on cytology. The other 3 cases proved to be malignant on histopathology as IDC(NOS).

Category V (Malignant): There were 36 cases diagnosed cytologically as malignant, all were compatible with the histological diagnosis and Invasive ductal carcinoma (IDC) was the most common diagnosis followed by mucinous carcinoma.

Table 1: Correlation of cytological and histopathological diagnosis

Histopathology		Granulomatous mastitis (%)	Fibroadenomatoid hyperplasia (%)	Acute mastitis (%)	Granulomatous mastitis with fibrocystic disease (%)	Benign phyllodes tumor (%)	Fibroadenoma (%)	Sclerosing adenosis (%)	Fat necrosis (%)	Simple duct hyperplasia (%)	Granulomatous mastitis with atypical duct hyperplasia (%)	Fibrocystic disease with focal atypical duct hyperplasia (%)	Fibrocystic disease with focal florid ductal hyperplasia (%)	Malignant lesions (%)
Cytology	No. of cases													
C1: Inadequate	3	-	-	-	-	-	-	-	1	-	-	-	1	1
C2: Benign	13	4	1	3	1	-	3	1	-	-	-	-	-	-
C3: Atypical probably, benign	9	-	3	-	-	2	-	-	-	1	1	-	-	2
C4: Suspicious, probably malignant	4	-	-	-	-	-	-	-	-	-	-	1	-	3
C5: Malignant	37	-	-	-	-	-	-	-	-	-	-	-	-	37
Total cases	66	4	4	3	1	2	3	1	1	1	1	1	1	43

Table- 2: Correlation of cytological and histopathological diagnosis of malignant lesions (n=42)

Cytopathology	Histopathology	Invasiveductal carcinoma,(NOS)	Mucinous carcinoma	Invasive lobular carcinoma	Medullary carcinoma	Intraductal papillary neoplasms (Intracystic)	Mixed Invasive ductal with cribriform carcinoma	Neuroendocrine carcinoma
C1: Inadequate		-	-	-	1	-	-	-
C2: Benign		-	-	-	-	-	-	-
C3: Atypical probably, benign		1	-	1	-	-	-	-
C4: Suspicious, probably malignant		3	-	-	-	-	-	-
C5: Malignant		30	3	1	-	1	1	1
Total cases		34	3	2	1	1	1	1

Efficacy and Diagnostic accuracy

Efficacy of FNAC of breast lesions in relation to malignancy had a sensitivity of 91.3%, specificity of 100%, positive predictive valve (PPV) of 100% and negative predictive value (NPV) of 90.6%.

The diagnostic accuracy of FNAC diagnosis was 85.7% in cases of malignant neoplasms and 86.9% in benign conditions .Overall diagnostic accuracy was 96.9%. Correlation was available by the way of histology in all 66 cases (100%). There was 2 discordant cases in this study which were diagnosed as atypical probably benign, turned out to be malignant (Invasive ductal and Invasive lobular carcinoma) on histopathology.

DISCUSSION

In the 66 women selected for our study, the age ranged from 20 to 90 years. In our study, the right breast was involved in 26 (40%) patients while the left breast was involved in 35 (53.58%)

patients. Bilateral involvement was seen in 4 (6.1%) patients. The observations regarding the age incidence, youngest and oldest age of occurrence in the present study are almost similar to the study by Pal S et al.[8] In the present study, the youngest patient with carcinoma of breast was 24 years old, the oldest being 87 years. Hussain[9], in his series, had 29 patients (58%) with a lump in the upper and outer quadrant and 9 had a lump in the upper and inner quadrant while 4 patients had a lump in the lower and outer quadrant.

In the present study, majority were infiltrating duct carcinoma NOS (78.6%) which is comparable to the study by New comer LM et al.10, (83.7%) followed by mucinous carcinoma (7.14%), invasive lobular carcinoma (4.76%), medullary carcinoma (2.38%), intraductal papillary neoplasms (Intracystic) (2.38%), mixed Invasive ductal with cribriform carcinoma(2.38%) and neuroendocrine carcinoma (2.38%).

All the 3 cases, were cytologically diagnosed as the benign lesions. Khanna S et al.[12] reported as fibroadenoma as the most common (72.8%) diagnosis in their series; Samir S. et al.[13] reported as 75.4% in their series; Malik R. et al.[14] reported as 59% in their series; while Choudhary et al.[15] reported fibroadenoma as second most common diagnosis next to fibrocystic disease in their series.

In the present study, benign phyllodes tumor is the third most common type among benign breast lesions. Out of 23 benign lesions, 2 cases were of benign phyllodes tumor which constituted 8.7%. Khanna S et al.[12] reported benign phyllodes tumor as 25.8 % in their series; Samir S. et al.[13] reported it as 2.9% in their series; Malik R. et al.[14] reported it as 1.8% in their series.

In present study 3 cases (4.61%) of fibrocystic disease were reported in association with granulomatous mastitis, focal atypical ductal hyperplasia and focal florid ductal hyperplasia. These cases were reported in 31-50 years of age group. Chaudhary et al[15] , Khanna et al[12] also reported fibrocystic disease most commonly in 3rd and 4th decade of life. Murad et al[16] found that cytology is not so diagnostic for fibrocystic disease as only few cases show foam cells and apocrine cells but recognition as a benign condition presented no problem.

1. Tumor size

Lower sensitivity of FNA has been associated with small tumour size (Yiangou C[20], O'Malley et al[21],) and with DCIS (Yiangou C[20], Sterrett et al[22]). Kerin et al[23] found over half of the false negatives in their study were infiltrating carcinomas less than 1 cm. The effects of tumor size on FNA sensitivity relate mainly to difficulty in sampling. DCIS lesions and small tumors (Matsuda et al[24]) or the presence of prominent fibrosis in the tumor (Matsuda et al[24]). Sampling difficulties may occur when the tumour is "missed" by the operator and may also be attributed to lack of persistence on the part of the operator (Bell et al[25]). Sterrett[22] et al found that the larger tumours also showed slightly lower figures for absolute sensitivity but no false negative results. The sensitivity of FNA of very small tumours can be enhanced by ultrasound guided FNAC.

2. Histology

Yiangou C[20] and Bell et[25] al found most of the false negatives were from small tumors with coexisting benign conditions. Invasive lobular carcinoma has been associated with a lower sensitivity than invasive ductal carcinoma (Sterrett et al[22]). Invasive lobular carcinoma may be more difficult to sample compared with invasive ductal carcinoma.[26]

3. Patient Age

There is some inconclusive discussion in the literature on the effect of patient age on the sensitivity of FNA and recent opinion in the literature is divided. Ashley et al[27] in a small retrospective study of 30 women suggested that FNA is more reliable in younger women because they have more cellular tumours with less fibrous stroma.

Stawbridge et al[28] calculated a total 7% false negative rate in their series. Out of which 5% were due to sampling error and 2% were due to cytological misinterpretation. They stressed that if clinical or radiological impression indicated a malignant lesion, a biopsy should be performed regardless of cytological findings.[29]

Zajicek[30] reported that a main reason for the false negative reports was not failure to reach the target, but the inability to collect malignant cells from the tumor that were possibly fibrotic or had a relatively low cell count.

CONCLUSION

Fine-needle aspiration cytology is a patient friendly, easy, reliable, repeatable and simple diagnostic test. A high sensitivity and a high positive predictive value proved that a positive The high specificity and a high negative predictive value for malignancy illustrated the high accuracy of FNAC in the diagnosis of malignancy in the breast. Thus, we have no hesitation in concluding that FNAC in conjunction with clinical examination and mammography is a very important preliminary diagnostic test in palpable breast lumps, in expert hands, the results show a high degree of correlation with the final histopathology report.

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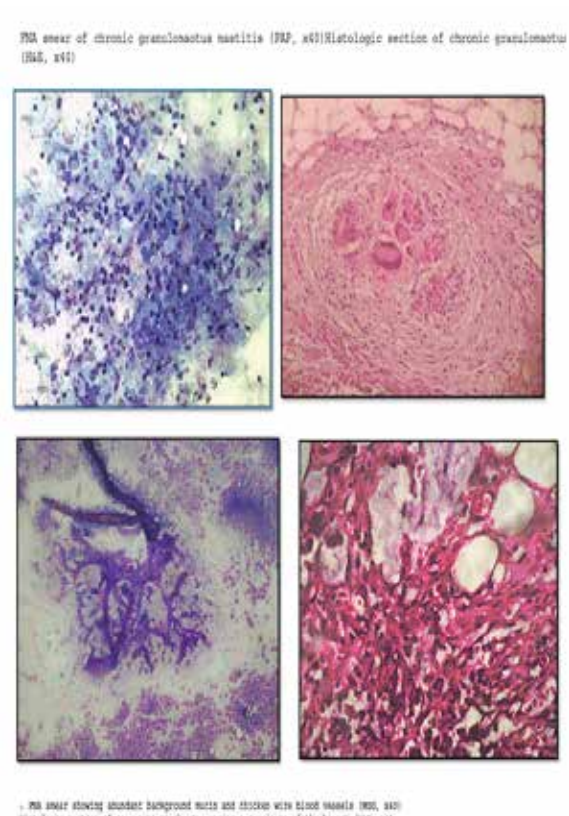

FNA smear of chronic granulomatous mastitis (PAP, x40)Histologic section of chronic granulomatou (H&E, x40)

, FNA smear showing abundant background mucin and chicken wire blood vessels (MGG, x40) Histologic section of same patient showing mucinous carcinoma of the breast (H&E, x40

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