Fine Needle Aspiration Cytology of Palpable Breast Lump: A Study of 1778 Cases

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Abstract

Background: Breast carcinoma is the most common malignant tumour and the leading cause of death from cancer in women. A large number of patients in Bangladesh have been suffering from breast cancer. Now-a-days, FNAC is being performed as a pre-operative test to evaluate breast lump. FNAC is cost effective and can prevent unnecessary surgery. As FNAC became more reliable in diagnosing malignancy and thereby the use of frozen-section histology had been reduced by about 80%. This study intended to look the frequencies of different lesions in FNAC of palpable breast lump.

Methods: FNAC was done in a total of 1778 female patients presented with palpable breast lump along with suspected enlarged axillary lymph node, if any. We assessed the age of the patient, lesion size, site, type of lesion and axillary lymph node metastasis in case of malignancies.

Results: Age ranges from 14-86 years with a mean age of 33.6 years. Most of the patients were in 21-30 years age group (38.13%). Among the lesions 508 (28.57%) fibroadenoma, 252 (14.17%) carcinoma, 210 (11.81%) fibrocystic changes, 141 (7.93%) abscess, 116 (6.52%) granulomatous lesion, 113 (6.3%) chronic mastitis were identified. 218 (42.91%) of fibroadenoma and 82 (32.54%) of carcinoma were in the age group 21-30 years and 31-40 years respectively. Mean lesion size was 4.3 ± 2 cm. Site distribution in different cases is almost equal. 116 of carcinoma patient were presented with palpable lymph node and showed metastasis in 26 (10.32%) cases.

Conclusion: FNAC serves as a rapid, economical, and reliable tool for the diagnosis of palpable breast lesions because the cytopathological examination of these lesions before operation or treatment, serves as an important diagnostic modality. Fibroadenoma was the commonest lesion in this study. However, malignancy was detected as the second common lesion.

Keywords: Fine Needle Aspiration Cytology (FNAC); Breast lump

Abbreviations: FNAC: Fine Needle Aspiration Cytology; AFB: Acid Fast Bacillus; UK: United Kingdom; FCD: Fibrocystic Disease; ADH: Atypical Duct Hyperplasia; DCIS: Ductal Carcinoma *In Situ*

Introduction

Breast carcinoma is the most common malignant neoplasm and the leading cause of death from cancer in women, with more than 1 million cases occurring worldwide annually [1]. However, in some regions of the world (North America, Western Europe and Australia) breast cancer mortality is finally beginning to fall, presumably because of the combined action of earlier diagnosis and improved therapy [2]. Countries with traditionally low incidence however are now experiencing the increase in the new registration also. A large number of patients in Bangladesh have been suffering from breast cancer. Each year the number of patients is increasing. Because of existing social circumstances female patients are hesitant to be examined by the clinicians for breast lump, the patients are reporting in advanced stage of malignancy.

Now-a-days, FNAC is being performed as a pre-operative test to evaluate the breast lump. A study of Khatun et al. [3] in the year 2000 evaluated the accuracy of FNAC on 310 patients presented with palpable breast lumps showed a very high sensitivity, specificity and accuracy. FNAC can prevent unnecessary surgery also. FNAC could provide a diagnosis with only 10-30% of the cost of surgical biopsy [4]. 95% accuracy in preoperative diagnosis of mammary cancer by clinicocytological combination was reported in a study [5]. As FNAC became more reliable in diagnosing malignancy and thereby the use of frozen-section histology had been reduced by about 80 % [6]. The present study is intended to look the frequency distribution of different lesions in FNAC of palpable breast lumps.

Material and Methods

The aim of the study was to see the distribution of different types of breast lesions among females of Chittagong in Bangladesh with the approval of ethical committee of Chittagong Medical College, Chittagong, Bangladesh. Female patients presenting with palpable breast lump were included in this study. In a period of three years, FNAC of consecutive 1778 patients were done after taking informed written consent. At least four slides were made from the aspirates. Palpable axillary lymph node was also selected for FNAC, if any. All the slides were stained with Pap stain and examined under light microscope. Data was recorded regarding the age of the patient, site of involvement, size of the lesion, cytological diagnosis and presence of metastasis in case of malignancies.

Results

The patients were from 14-86 years of age with a mean of 33.61 years. 21-30 years age group comprises most of the patient (678 =38.13%) followed by 31-40 years age group (428=24.07%). Among

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the type of the lesions, fibroadenoma showed the highest (508=28.57%) incidence followed by carcinoma (252=14.17%) and fibrocystic disease (210=11.81%) cases. Inflammatory lesions were abscess 141 (7.93%), chronic mastitis 113 (6.36%), granulomatous mastitis 116 (6.52%) and fat necrosis 06 (0.34%). 308 (17.3%) cases designated as 'others' included fatty tissue, unsatisfactory smears.

Highest number of fibroadenoma (218) was in the age group of 21-30 years and the <20 years group was second (196). Maximum of carcinoma cases were in the age group of 31-40 and 41-50 years of age group (82 and 59 respectively). Among the inflammatory lesions, highest number was seen in the age group of the 21-30 years group (Table 1).

We found 116 (6.52%) cases of granulomatous mastitis. Among them 58 (50%) were non-caseating, 58 (50%) were caseating consistent with tuberculosis. Among the caseating granuloma cases, 31 (26.72%) were associated with suppuration. Ziehl-Neelsen stain of the suspected tuberculosis cases was done and found 12 cases positive for Acid Fast Bacilli (AFB) (Table 2).

The mean age of the suspicious for malignant cases were 44.89 ± 8.51 years, malignant cases were 44.38 ± 13.12 years and of the other cases were 30.24 ± 10.99 years (Table 3). Regarding side involvement, almost in all cases either left or right side involvement was nearly equal (Table 4). Mean lesion size of all 1778 breast lumps were 4.3 ± 2.7 cm and mean lesion size of 252 carcinoma cases were: 2.3 ± 1.2 cm. Among malignant lesions 60.71% were presented with a size less than 2 cm and 36.51% presented with 2-5 cm (Table 5).

Among 252 Duct cell carcinoma patient only 116 showed palpable axillary lymph nodes and 26 (10.32%) cases of these showed presence of metastasis and rest 90 (35.71%) were reactive lymph nodes (Table 6).

Discussion

The study population ranged from 14-86 years with a mean age of 33.6 years. Ahmed et al. [7] from Sudan reported 15-85 years of age range with a mean of 37 years. Bukhari et al. [8] showed a range of 16-70 years in Pakistan, Kumar [9] reported 6-72 years and Tiwari [10] 17-56 years in Nepal with a mean age of 34 and 32 years respectively and 18-92 years with a mean age of 59.3 years were reported by Dennison et al. [11] in United Kingdom (UK). The higher age range of this study from Nepal and Pakistan may be explained by the increased life expectancy rates from those countries. Again the lower age range from the study of UK is also may be due to lower life expectancy rate of Bangladesh compared to UK.

In this study, the lesion presented in the right breast was 49.05% and the left breast was 47.55% and 3.4% cases involved both. Kumar [9] observed a deviation from our results with a little predominance of right breast (51.4%). This might an incidental findings and it required very large group population based study to find out any significant difference. Regarding malignant cases we observed 49.60% cases involved the right side, 48.81% involved the left and 1.59% involved both. Rupom et al. [12] found 58.18% of malignant lesion in the right breast. Again it may be due to smaller number of cases (55) for which their result did not correspond with ours.

Lesion Category	Diagnosis	Upto 20 years	21-30 years	31-40 years	41-50 years	51-60 years	>60 years	Total	%
Inflammation	Abscess	06	69	41	16	05	04	141	7.93
	Chronic Mastitis	27	48	21	13	03	01	113	6.36
	Granuloma Mastitis	05	63	34	11	03	00	116	6.52
	Fat necrosis	01	01	04	00	00	00	06	0.34
Cystic lesion	Galactocele	05	30	07	01	00	00	43	2.42
	Benign cystic lesion	01	11	04	06	01	00	23	1.29
	Fibrocystic disease	06	78	63	48	11	04	210	11.81
Benign neoplasm	Lactating adenoma	03	02	00	00	00	00	05	0.28
	Fibroadenoma	196	218	68	22	04	00	508	28.57
	Benign Phyllodes	00	00	02	03	00	00	05	0.28
Atypia	ADH	00	05	06	07	02	00	20	1.12
	Suspicious malignancy	00	00	09	14	03	02	28	1.60
Malignant neoplasm	Carcinoma	03	36	82	59	46	26	252	14.17
Others	Fatty tissue	07	16	12	14	05	06	60	3.36
	Inadequate smears	29	101	75	18	20	05	248	13.94
Total		289	678	428	232	103	48	1778	100

Table 1: Frequency distribution of different categories of lesions according to age groups.

Granulomatous inflammation	Frequency		AFB positive
	n	%	
Non caseating granulomatous inflammation	58	50.00	Not done
Caseating granuloma consistent with tuberculosis	27	23.28	7
Caseating granuloma associated with suppuration	31	26.72	5
Total	116	100.00	12

Table 2: Frequency distribution of types of granulomatous mastitis.

Diagnoses	N	Mean	SD	Median	Range
Suspicious Malignancy	28	44.89	8.51	44.00	31 – 70
Carcinoma	252	44.38	13.12	42.00	18 – 86
Rests	1498	30.24	10.99	29.00	14 – 86
Total	1778	33.61	12.41	31.00	14 – 86

Table 3: Statistics of age (years) among different diagnoses.

Category	Right		Left		Both		Total
	n	%	n	%	n	%	
Inflammation	193	51.33	176	46.81	7	1.86	376
Cystic lesion	142	51.45	122	44.20	12	4.25	276
Benign neoplasm	238	45.95	253	48.84	27	5.21	518
Atypia	23	47.92	25	52.08	-	-	48
Malignant neoplasm	125	49.60	123	48.81	04	1.59	252
Total	721	49.05	699	47.55	50	3.40	1470

Table 4: Side involvement by different lesion.

Carcinoma	Size of the malignant breast lesion			Total	Palpable Axillary LN
	<2 cm	2-5 cm	>5 cm		
Duct cell carcinoma	153 (60.71%)	91 (36.11%)	07 (2.78%)	251	116
Lobular carcinoma	00	01 (0.40%)	00	01	00

Table 5: Size of malignant breast lesion.

Lymph Node	No. of cases	%
Metastatic	26	10.32
Reactive	90	35.71
Not Palpable	136	53.97
Total	252	100.00

Table 6: Axillary lymph node status in the carcinoma patients.

Regarding inflammatory lesions of the breast, this study found total 21.15% cases. This result are supported by the findings from Pakistan by Bukhari et al. [8] 20%, from Nepal by Kumar [9] 22.6%, though findings of Nemaqani and Yaqoob [13] showed little higher (26.5%) from Kingdom of Saudi Arabia. The major difference of this study was that we found 6.52% of granulomatous mastitis cases which was reported very low in their studies; 2.3% by Bukhari et al. [8] and none by Kumar [9].

Among the granulomatous mastitis we found 27 (23.28%) cases of caseating granuloma, 31 (26.72%) cases of caseating granuloma with suppuration and 58 (50%) cases of granulomatous mastitis of unknown etiology. Tse et al. [14] reported 31% with suppuration among their 26 case of granulomatous mastitis and Lacambra et al. [15] reported from HongKong 29 (46.77%) cases of tuberculosis mastitis among total 62 cases which also included associated supportive cases. The difference from the study of Bukhari et al. [8] is may be due to their smaller sample size. Though Lacambra et al. [15] reported 28 cases but they were found in eight years timeframe. Our study showed as many cases found within three years and this reflected the burden of tuberculosis in this region due to overpopulation, poor hygiene and malnutrition. We also did Ziehl-Neelsen stain of the suspected tuberculosis cases and found 12 cases positive for AFB. Though it is ideal to go for a PCR analysis for the detection of mycobacterium DNA, but this is not much available and affordable here.

We also found 43 (2.42%) cases of galactoceles, revealed milk during aspiration and microscopically histiocyte in the background of milk. Majority of the cases were in the age group of 21-30 yrs which is the most active reproductive years.

There were 23 (1.29%) cases in which serous fluid mixed with blood came out on aspiration and subsequently under microscope histiocytes and chronic inflammatory cells. In all cystic masses, re-aspiration of any residual mass is recommended [16] and even in the absence of a residual mass. Re-aspiration of the wall of the cyst yielded fairly cellular smears with more likelihood of viable epithelial cells. The cyst wall could also presumably be a good target for the detection of associated epithelial proliferative lesions with or without atypia.

Regarding fibrocystic disease of breast, we found 210 (11.81%) cases in this study. There incidence were highest in the 21-30 yrs age group (78=37.14%) and second highest in 30-40 years age group (63=30%). In the study of Kumar [9] we can see fibrocystic disease (FCD) comprises 41.2% with an average age of 31 years and most of the cases were within the age group of 30-40 years. FCD also consist the highest number of FNAC cases (49%) in the other study from Nepal by Pradhan and Dhakal [17]. Bukhari et al. [8] found 90 (21.17%) FCD in their study was 425 cases in Pakistan. The number of FCD in our study is much lower than the above mentioned studies. The possible reason may be that, since it is not a population based study, we may not get the exact scenario. Besides, FCD presents with ill defined mass with no pain or less complaints. Female may feel reluctant to seek consultation for this type of lesion. And also the number of cases is much higher than the other three studies which also may contribute to the discrepancies.

Fibroadenoma was the major (28.57%) cause of the breast lump in this study. 218 (42.9%) and 196 (38.58%) were in the age group of 21-30 and <20 years age group respectively. This finding was similar (28%) to the findings of Ahmed et al. [7] from Sudan among their 200 cases. And near similar to the findings of Kumar [9] and Mayun et al. [18] as their result were 22% and 23.7%. Besides Bukhari et al. [8] showed 16% and Pradhan and Dhakal [17] showed only 8% of fibroadenoma cases. The higher rate than the last two studies was perhaps caused by increased awareness among young women about the breast lump in this country. Our study showed much lower rate of fibroadenoma when compared to the study of Rahman et al. [19] (38.3%), which may be explained by their smaller sample size. On the other hand, it was not a population based study, rather sampled consecutively from the patients attending the laboratory for FNAC with complaints of breast lump. Mayun et al. [18] found average age of fibroadenoma was 16 years but this study found most of the cases in the age group of 21-30 years. This demands further investigation to find out whether there is any cause of this age difference in relation to inhabitation or ethnicity.

A total number of 20 (1.12%) cases of atypical duct hyperplasia (ADH) were found. This study also reports 28 (1.60%) cases of suspicious for malignant cells. Pradhan and Dhakal [17] reported 2.3%, Yip et al. [20] 3.81% and Ahmed et al. [7] 2.5%. They needed core biopsy for confirmation of malignancy. Bukhari and Akhtar [21] and Bukhari et al. [8] found 11.42 % and 8.4% suspicious cell for malignancy respectively. 139 (9%) cases were atypical/suspicious for malignancy reported by Rosa et al. [22] and 51 (3.3%) atypical by Yeoh and Chan [23]. Cytologic atypia comprises nuclear pleomorphism, loss of cohesiveness, irregular nuclear contours, irregular chromatin pattern, hyperchromasia, and high nuclear/cytoplasmic ratio. Architectural atypia corresponds to cribriform clusters, overlapping, and crowding [24,25]. For practical purposes, ADH and low grade DCIS (ductal carcinoma *in situ*) are better categorized as proliferative breast disease with atypia/borderline lesions since all of these lesions will require excisional biopsy [26,27].

Considering malignant cases in female breast, we found 252 (14.17%) carcinoma cases, among which 251 cases were duct cell carcinoma and only one was lobular carcinoma. Previous study in this country by Rupom et al. [12] showed 13.74% (72/524) of malignant cases in FNAC. Pradhan and Dhakal [17] also reported 15.5% malignant cases among their 2246 cases which are close to our study. Though Yip et al. [20] and Bukhari and Akhtar [21] found near results but their numbers of cases were relatively smaller, 676 and 175 respectively. Ahmed et al. [7] in Sudan, Mayun et al. [18] in Nigeria and Bukhari et al. [8] in Pakistan reported 30.5%, 40% and 31% malignant cases which reflects less awareness of women to attend health facilities with smaller

breast lumps but an ugly looking or very painful lesion. In this country, earlier study in 2002 by Khatun et al. [3] showed only 14/310 (4.32%) of malignant cases indicating higher cancer burden or higher percentage of reporting. 31-40 age group showed highest number of malignant cases 82 (32.54%) and 41-50 years group showed 59 (23.41%) and we may conclude the majority (55.95%) of the patient found in the middle age from 31-50 years. Majority of the patients (65.8%) in the age group of 31- 50 years were also observed by Sandhu et al. [28] in India and Rupom et al. [12] found highest frequency in the 4th decade of life.

However, reports from the western world show that female breast carcinoma is predominantly seen in the fifth and sixth decade [29-31]. Farooq and Coleman [32] compare age incidence between the South Asian and Non- South Asian breast carcinoma patient in England and Wales and found mean age at diagnosis of the South Asian women were 51.8 years compared with 62.8 years for non-south Asians and 16% (compared with 5%) aged under 40 years at diagnosis.

So we also conclude with Sandhu et al. [28] that mean age of our female breast cancer patients was found to be lower compared to the western world with an average difference of one decade. Early age of menopause in Indian females in comparison to their western counterparts has been observed in the past [33]. The earlier published reports also show that the risk of breast carcinoma increases with increasing age of menopause, possibly because the women are exposed to hormones for a longer duration [34-36].

During aspiration, we found 116 of 252 breast carcinoma with palpable lymph node. 26 (10.32%) of them showed features of metastasis duct cell carcinoma. Sapino et al. [37] found 49 (16.44%) malignant cases with metastasis and Sinha et al. [38] reported 45.76% with metastatic axillary lymph node. Findings of Sapino et al. [37] is consistent with our findings and the discrepancies from that of Sinha et al. [38] is due to their very small sample size compared to other two studies. There was no scope of the study to find any other metastatic foci.

The number of cases those were included in 'others' comprised of 248 (13.94%) inadequate aspirates and 60 (3.36%) fatty tissue. Inadequacy of the aspirated material for cytological diagnosis has been reported 20% and 25.3% by Hitchcock et al. [39] and Park and Ham [40] and it reduces the sensitivity of the cytology. Our study showed 14% inadequacy. Bukhari et al. [8] reported 20% inadequacy and reduced the number by repeating up to twice. Insufficient cases require re-evaluation of clinical and radiological findings as well as adequate follow-up, mostly in cases of palpable breast abnormalities [22].

Conclusion

Fibroadenoma is the commonest lesion in this study and is found mostly in the age group of 21-30 years. Malignancy was detected as the second common lesion and majority was found in 31-40 years age group. Breast carcinoma patients of this region are at the lower age of one decade than that of western women. Caseating granulomatous mastitis due to tuberculosis is increasing in Bangladesh.

Authors' contribution

1. Mohammad Zillur Rahman: Aspiration from breast lumps, examination of the smears, FNAC reporting, paper composing and editing.

2. Saiful Islam: Counseling, taking consent, data entry, record keeping, data compilation, internet searching for references, paper composing & editing.

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