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

Rahman MZ1* and Islam S2

1Head of the Department, Department of Pathology, Chittagong Medical College, Chittagong, Bangladesh
2Lecturer in Pathology, Department of Pathology, Chittagong Medical College, Chittagong, Bangladesh

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 clinico-cytological 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 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.

*Corresponding author: Mohammad Zillur Rahman, Associate Professor of Pathology, Head of the Department, Department of Pathology, Chittagong Medical College, Chittagong, Bangladesh. Tel: +880-1819-315116; E-mail: drzillur@gmail.com

Received December 29, 2012; Accepted January 27, 2013; Published February 05, 2013


Copyright: © 2013 Rahman MZ, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
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. Buhari 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 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.

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

<table>
<thead>
<tr>
<th>Lesion Category</th>
<th>Diagnosis</th>
<th>Upto 20 years</th>
<th>21-30 years</th>
<th>31-40 years</th>
<th>41-50 years</th>
<th>51-60 years</th>
<th>&gt;60 years</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflammation</td>
<td>Abscess</td>
<td>06</td>
<td>69</td>
<td>41</td>
<td>16</td>
<td>05</td>
<td>04</td>
<td>141</td>
<td>7.93</td>
</tr>
<tr>
<td></td>
<td>Chronic Mastitis</td>
<td>27</td>
<td>48</td>
<td>21</td>
<td>13</td>
<td>03</td>
<td>01</td>
<td>113</td>
<td>6.36</td>
</tr>
<tr>
<td></td>
<td>Granuloma Mastitis</td>
<td>05</td>
<td>63</td>
<td>34</td>
<td>11</td>
<td>03</td>
<td>00</td>
<td>116</td>
<td>6.52</td>
</tr>
<tr>
<td></td>
<td>Fat necrosis</td>
<td>01</td>
<td>01</td>
<td>04</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>06</td>
<td>0.34</td>
</tr>
<tr>
<td>Cystic lesion</td>
<td>Galactocele</td>
<td>05</td>
<td>30</td>
<td>07</td>
<td>01</td>
<td>00</td>
<td>00</td>
<td>43</td>
<td>2.42</td>
</tr>
<tr>
<td></td>
<td>Benign cystic lesion</td>
<td>01</td>
<td>11</td>
<td>04</td>
<td>06</td>
<td>01</td>
<td>00</td>
<td>23</td>
<td>1.29</td>
</tr>
<tr>
<td></td>
<td>Fibrocystic disease</td>
<td>06</td>
<td>78</td>
<td>63</td>
<td>48</td>
<td>11</td>
<td>04</td>
<td>210</td>
<td>11.81</td>
</tr>
<tr>
<td>Benign neoplasm</td>
<td>Lactating adenoma</td>
<td>03</td>
<td>02</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>05</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td>Fibroadenoma</td>
<td>196</td>
<td>218</td>
<td>68</td>
<td>22</td>
<td>04</td>
<td>00</td>
<td>508</td>
<td>28.57</td>
</tr>
<tr>
<td></td>
<td>Benign Phyllodes</td>
<td>00</td>
<td>00</td>
<td>02</td>
<td>03</td>
<td>00</td>
<td>00</td>
<td>05</td>
<td>0.28</td>
</tr>
<tr>
<td>Atypia</td>
<td>ADH</td>
<td>00</td>
<td>05</td>
<td>06</td>
<td>07</td>
<td>02</td>
<td>00</td>
<td>20</td>
<td>1.12</td>
</tr>
<tr>
<td>Malignant neoplasm</td>
<td>Suspicious malignancy</td>
<td>00</td>
<td>00</td>
<td>09</td>
<td>14</td>
<td>03</td>
<td>02</td>
<td>28</td>
<td>1.60</td>
</tr>
<tr>
<td></td>
<td>Carcinoma</td>
<td>03</td>
<td>36</td>
<td>82</td>
<td>59</td>
<td>46</td>
<td>26</td>
<td>252</td>
<td>14.17</td>
</tr>
<tr>
<td></td>
<td>Fat necrosis</td>
<td>07</td>
<td>16</td>
<td>12</td>
<td>14</td>
<td>05</td>
<td>06</td>
<td>60</td>
<td>3.36</td>
</tr>
<tr>
<td>Others</td>
<td>Inadequate smears</td>
<td>29</td>
<td>101</td>
<td>75</td>
<td>18</td>
<td>20</td>
<td>05</td>
<td>248</td>
<td>13.94</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>289</td>
<td>678</td>
<td>426</td>
<td>232</td>
<td>103</td>
<td>48</td>
<td>1778</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 2: Frequency distribution of types of granulomatous mastitis.

<table>
<thead>
<tr>
<th>Granulomatous inflammation</th>
<th>Frequency</th>
<th>AFB positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non caseating granulomatous inflammation</td>
<td>58</td>
<td>50.00</td>
</tr>
<tr>
<td>Caseating granuloma consistent with tuberculosis</td>
<td>27</td>
<td>23.28</td>
</tr>
<tr>
<td>Caseating granuloma associated with suppuration</td>
<td>31</td>
<td>26.72</td>
</tr>
<tr>
<td>Total</td>
<td>116</td>
<td>100.00</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Diagnoses</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspicious Malignancy</td>
<td>28</td>
<td>44.89</td>
<td>8.51</td>
<td>44.00</td>
<td>31 – 70</td>
</tr>
<tr>
<td>Carcinoma</td>
<td>252</td>
<td>44.38</td>
<td>13.12</td>
<td>42.00</td>
<td>18 – 86</td>
</tr>
<tr>
<td>Rests</td>
<td>1498</td>
<td>30.24</td>
<td>10.99</td>
<td>29.00</td>
<td>14 – 86</td>
</tr>
<tr>
<td>Total</td>
<td>1778</td>
<td>33.61</td>
<td>12.41</td>
<td>31.00</td>
<td>14 – 86</td>
</tr>
</tbody>
</table>
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. Architectual 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].
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 mostly in the age group of 21-30 years. Malignancy was detected as a follow-up, mostly in cases of palpable breast abnormalities [22].

**References**


