Fine Needle Aspiration Cytology Breast Lesions – Its Concordance with Histopathological Examination of Excised Lesion

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Abstract

Background: To assess the accuracy of fine needle aspiration cytology and comparing it with histopathological examination of excised lesion.

Methods: In this cross sectional study palpable breast lumps referred for FNAC were included. Fine needle was used to aspirate the palpable lump and spread on the frosted slides to make the smears. These smears were fixed in ethyl alcohol and stained. Diagnosis was given along with categorization of the lesion using an internationally recommended reporting format. Sensitivity, specificity and diagnostic accuracy of FNAC was calculated using 2 x 2 table keeping histopathology as gold standard and FNAC as test.

Results: Out of 73 patients majority (93%) were females. Age ranged between 10 to 80 years with mean age of 38 years (± 17). Right breast was involved in 66% cases and bilateralism was seen in 4%. Definite diagnosis was given in 85% cases with 63% reported as benign and 22% reported as malignant. There were no false positive cases and two false negative cases were reported. Sensitivity and specificity of breast FNAC in the diagnosis of malignancy was found to be 89% and 100 % respectively

Conclusion: FNAC of palpable breast lumps is a reliable method for early diagnosis and management of lesions and the false negative results can be eliminated by examining the slides carefully before giving a negative diagnosis.

Key Words:Fine needle aspiration, cytology, breast lesion

Introduction

History of fine needle aspiration cytology (FNAC) dates back to middle of nineteenth century. Kun and Lebert used to diagnose cancers by employing this technique.1,2 Only few pathologists were involved in these early days and mainly it was clinicians who used this simple technique. The procedure began to flourish almost one hundred years after the pioneer work.3,4

A palpable breast lesion is worrisome for both the patient and treating physician as the rate of breast carcinoma is increasing world over and Pakistan also has a very high prevalence rate.5 It is due to this very fact that early diagnosis of palpable breast lumps has become all the more important. FNAC is reliable, rapid and economical method and if combined with clinical impression and radiological findings (mammogram/ ultrasound) can lead to reliable diagnosis.6 This “triple approach” method leads to proper management of the patient. If all three modalities agree that lesion is benign or malignant, only then the lesion is managed as a benign or a malignant lesion.7 In case of disagreement by any one or two of the three, core needle biopsy/ lumpectomy should be performed. There has been concern about non diagnostic or inadequate nature of aspirates in FNACs of breast lumps but it can be reduced to a non significant level of the procedure is performed by the same pathologist who will report the case.8,9

Patients and Methods

This cross sectional validation study was carried out in Department of Pathology, Military Hospital Mangla from January 2009 to December 2009. All cases of palpable breast lumps referred for FNAC were included in the study. Uncooperative patients and patients which had previously gone through FNAC were not included in the study. The skin over the palpable lump was cleaned using alcohol or spirit swab by moving it in circular outward direction from the site of aspiration. Aspiration was done with 24 gauge needle. In all cases the lump was aspirated twice from two different sites. The aspirated material was spread on clean glass slides (frosted at one end).
The slides were immediately fixed in 95% ethyl alcohol. Minimum of four slides of each case were made. Two were stained with Papanicolaou stain and two with Haematoxylin and Eosin stain. The slides were then examined under light microscope using x 4, x 10 and x 40 objective lenses. The diagnosis was given along with categorization of the lesion using an internationally recommended NHSBSP guidelines supplemented by a descriptive report. There are five categories according to this format. C1 represents a non diagnostic or inadequate aspirate and warrants a repeat FNAC. C2 is benign and the patient has to be followed up. C3 is atypia probably benign and C4 is suspicious for malignancy. C5 is mentioned in the report when there is definite evidence of malignancy.

The diagnosis given on FNAC was then recorded along with the diagnosis given on histopathology when the resected specimen was received later for each patient. Sensitivity, specificity and diagnostic accuracy of FNAC was calculated using 2 x 2 table keeping histopathology as gold standard and FNAC as test.

**Results**

During the year 2009, palpable lump breast was the most common lesion for referral to the pathology department. There were total of 73 cases which constituted 32% of the overall referral to the pathology department. Sixty Eight (93%) cases were females while 5 (7%) were males. Age ranged between 10 to 80 years with mean age of 38 years (± 17). Right breast was involved in 48 (66%) cases, left breast in 22 (30%) cases while bilateralism was seen in 3 (4%) cases. In majority (85%) of the cases, a definite diagnosis of either a benign or a malignant lesion was given. Forty six (63%) cases were reported as benign (C-2 category) including one case of chronic caseating granulomatous inflammation and 16 (22%) cases as malignant (C-5 category) (Table 1). Almost 1 out of every 5th case of palpable lump breast referred had malignancy. All patients with malignancy were women with more than 30 years of age and their median age was 43 years. Size of carcinoma ranged from 2.5 to 7.5 cm with median size of 5 cm. Right breast was involved in 12 (75%) cases and left in 4 (25%) cases. There were no false positive cases while 2 false negative cases were reported. These two cases were reported as benign inflammatory lesions on FNAC. Later on lumpectomy was performed and histopathological examination of both cases revealed invasive ductal carcinoma. So the sensitivity and specificity of breast FNAC in the diagnosis of malignancy was found to be 89% and 100% respectively using 2 x 2 table and the diagnostic accuracy was 97% keeping histopathology diagnosis as gold standard (Table 2).

**Table 1. FNAC diagnosis of breast lumps**

<table>
<thead>
<tr>
<th>Diagnostic category</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C = 1, Non diagnostic</td>
<td>09 (12%)</td>
</tr>
<tr>
<td>C = 2, Benign</td>
<td>46 (63%)</td>
</tr>
<tr>
<td>C = 3, Atypia probably benign</td>
<td>01 (1.5%)</td>
</tr>
<tr>
<td>C = 4, Suspicious for malignancy</td>
<td>01 (1.5%)</td>
</tr>
<tr>
<td>C = 5, Malignant neoplasm</td>
<td>16 (22%)</td>
</tr>
<tr>
<td>Total</td>
<td>73 (100%)</td>
</tr>
</tbody>
</table>

**Table 2. Standard 2 x 2 contingency table of Breast FNAC using histopathology diagnosis as gold standard**

<table>
<thead>
<tr>
<th>FNAC Test</th>
<th>Histopathology (Gold standard)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive (Malignant)</td>
<td>Negative (Benign)</td>
</tr>
<tr>
<td>Positive (Malignant)</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>Negative (Benign)</td>
<td>02</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>44</td>
</tr>
</tbody>
</table>

**Discussion**

FNAC of a palpable lump breast when combined with triple approach is a well established method for evaluation of the breast lesions with diagnostic accuracy of over 99%. With early diagnosis, a patient’s chance of surviving breast cancer is higher than 90%. Late reporting with an advanced stage of disease is not an uncommon happening in our set up. Illiteracy and poor socioeconomic conditions can be held responsible for it. Pakistan has the highest rate of breast cancer for any Asian population accounting to 40,000 deaths per year.

The sensitivity for FNAC of breast lumps is 83.3% to 97.0%. The specificity was 100% for Tiwari, Aziz et al and Hussain et al and 99.4% for Qingqing et al. The results of these studies are comparable to our study with sensitivity in the range of 83% to 97% and specificity almost 100% for all the studies. In present study there were no false positive cases. Not all errors in medical diagnosis and treatment are necessarily malpractice because there are certain risks and margins for error that arise inherently in the practice of medicine. Surgical pathologists and cytopathologists are physicians, but they are humans too. They have as great a capacity for error and susceptibility to subjective distractions as other
practitioners of the art of medicine. Clinicians believe that pathologists have all the ingredients to produce a statement of absolute truth given a small piece of tissue or aspirate, but even more dangerous to the mankind is the pathologist who also believes in this concept. In FNAC of breast lesions false positive diagnosis although rare has been committed in centers of excellence. Over a period of four years there were 1104 cases reported as carcinoma by FNAC at the Royal Marsden Hospital and in four of these the diagnosis was subsequently proven to be benign. The benign conditions that led to false positive cytology diagnoses were radiation induced changes, granulomatous mastitis and fibroadenoma. The French institute of Curie, the state of art centre for cancer diagnosis has published their 44 years experience. They reported 23 false positive cases during this period.

False negative rate is generally less than 5 %. In our study there were 2 false negative (2.7%) cases. Both were females in their 6th decades of life and had single palpable lumps measuring 3 and 4 cm respectively in maximum diameters in right breast. The slides of these two cases were re examined. Aspirate was hypocellular and staining of slides was not of good quality. Scanty inflammatory infiltrate composed of neutrophils and histiocytes was seen. The diagnosis of a benign inflammatory lesion on a hypocellular aspirate with low quality slides should not have been given and rather the procedure should have been repeated. Both these cases were reported by only one pathologist and second opinion was not sought. Here it’s worth quoting what Stephen S. Sternberg wrote in the preface to the first edition of Sternberg’s diagnostic surgical pathology. “We speak of the loneliness of the long distance runner, but there may be no one lonelier than a surgical pathologist working solo” and “knowing when and what one doesn’t know is of singular importance”.

Diagnostic consultation is strongly recommended in cases of slightest of diagnostic doubt.

Conclusion
1. FNAC of palpable breast lumps is a reliable method for early diagnosis and management of lesions.
2. False negative results can be eliminated by carefully examining the slides, repeating the test if doubt emerges and consultation with another pathologist.

References