

# Diagnostic Evaluation of Fine Needle Aspiration Cytology in the Management of Palpable Breast Lesions

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## Abstract

A total of 113 fine needle aspirates of the breast masses were evaluated in which the subsequent biopsy or mastectomy specimen were also available for histological examination. The age ranged from 16 to 80 years with a mean of 42 years. In benign conditions the mean age was 34.7 years while in malignant cases it was 48 years. The cytological diagnoses were compared with the histological results which revealed that the specificity and sensitivity of fine needle aspiration cytology in the palpable breast lesions was 86.1% and 89.2% respectively with a positive predictive value of 93% and efficiency of 88.2%. Similar statistics from other series in which the cytological results of breast lesions were compared with histological results, revealed almost same results which suggest that fine needle aspiration cytology is an effective and accurate technique for the diagnosis and management of palpable breast lumps (JPMA 48:7,1998).

## Introduction

Cytological examination of fine needle aspirates of the palpable breast lesions has become a widely used adjuvant diagnostic technique in the management of breast lumps<sup>1,3</sup>. Fine needle aspiration is a simple procedure requiring no special instruments and providing rapid interpretation with a high degree of diagnostic accuracy reported from 76% to 96%<sup>1,2,4-6</sup>. Due to simplicity, accuracy, cost effectiveness and less chances of complications, the fine needle aspiration is well tolerated by the patients and in many instances, it has replaced open biopsy and frozen sections. The present study was carried out in the department of pathology, the AgaKhan University Hospital, Karachi, to evaluate the diagnostic accuracy of fine needle aspiration cytology in palpable breast lesions by comparing its results with histological diagnoses of the subsequent open biopsy or mastectomy specimens of these patients.

## Materials and Method

The fine needle aspirations performed at the clinical laboratory of the Aga Khan University Hospital in the period January to October, 1996 were included in the study in which the subsequent open biopsy or mastectomy specimens were received for histological diagnosis. The fine needle aspirations were done according to the standard methods by using a 21 gauge needle and 10 ml disposable syringe. Two to four slides were made from the aspirates and wet fixed with 95% ethanol. The smears were stained with hematoxylin and eosin and papanicolaou stains. The rest of the material was submitted for cell block preparation. After thorough examination of the smears the cases were grouped into four major diagnostic categories.

1. Positive for malignant cells.
2. Atypical or suspicious of malignancy.
3. Benign
4. Unsatisfactory material or inadequate for proper interpretation.

The aspirates were declared adequate/satisfactory when cytological examination revealed more than

four to six well visualized cell groups. Each group could be a cluster of more than six cells or a sheet of more than ten cells. The results of cytological diagnosis of these patients were compared with the histological diagnosis of the subsequent tissue specimens i.e. open biopsy or mastectomy received within a period of six months. The statistical methods of Galen and Gambino were employed for the calculation of sensitivity, specificity, positive predictive value and efficiency<sup>8</sup>.

## Results

A total of 113 fine needle aspirates were evaluated in which the subsequent histological diagnosis were available for comparison. Results of cytological diagnosis are shown in Table 1.

**Table I. Cyto-histologic diagnostic correlation of breast lesion.**

| Cytology                  | No. of cases | Benign (histology) | Malignant (histology) |
|---------------------------|--------------|--------------------|-----------------------|
| Malignant                 | 41           | -                  | 41                    |
| Suspicious of malignancy  | 30           | 5                  | 25                    |
| Benign                    | 37           | 31                 | 6                     |
| Inadequate/unsatisfactory | 5            | 3                  | 2                     |
| <b>Total</b>              | <b>113</b>   | <b>39</b>          | <b>74</b>             |

The comparison between cytological and subsequent histological diagnoses revealed that 41(100%) cases were diagnosed to be malignant both on cytology and histology. Of the 30 cases, reported as suspected malignancy, the histological examination confirmed it in 25 (83.3%) specimens, while five were benign. Of the 37 specimens labelled benign on cytology, subsequent histology proved six (16.2%) to be malignant. The sensitivity and specificity of fine needle aspiration cytology was calculated to be 89.2% and 86.1% with positive predictive value of 93% and efficiency of 88.2%. All the patients were females. The age ranged from 24 to 80 years with mean of 42.3 years in malignant cases while in benign conditions the age varied from 16 to 65 years with mean of 34.8 years. The tumour size was 1.5 cms to 11 cms with average of 4.1 cms. None of the patients developed any complication during the procedure.

## Discussion

The fine needle aspiration cytology has achieved great importance in the diagnosis and management of palpable breast lesions. Due to simplicity, safety and diagnostic accuracy this procedure has replaced open biopsy and frozen sections.<sup>7,9</sup> In clinical practice, breast lesions are one of the important and common medical problems of the female population, with breast carcinoma being the most common

malignant tumour especially in females<sup>10-13</sup> In the presented study, there was no discrepancy in the diagnosis of the 41 malignant cases between cytology and histology. Of the thirty cases suspected of malignancy, twenty five (83.3%) were confirmed on histological examination. All had focally atypical cells and frozen section/open biopsy was recommended. The benign cases were fibroadenoma, phyllodes tumour, duct ectasia, papillomatosis and fibrocystic disease. Occasionally, increased cellularity, loss of cohesion and nuclear atypia in the aspirates from intraductal papilloma<sup>14</sup>, fibroadenoma and fibrocystic disease<sup>15,16</sup> may lead to erroneous interpretation. Of the thirty-seven cases diagnosed benign on cytology, six were proved malignant on histological examination. These included three infiltrating ductal carcinomas, two infiltrating lobular carcinomas and one papillary carcinoma. In all these cases the tumour size was less than 2 cms. False negative results could be found in monomorphic, well differentiated carcinomas, lobular carcinomas and sclerotic carcinomas<sup>6</sup>. In the present study the sensitivity and specificity of fine needle aspiration cytology was 89.2% and 86.1% respectively with positive predictive value of 93% and efficiency of 88.2%. The results were compared with the other series (Table II).

Table II. Comparison with the other series of breast aspiration cytology.

|                           | Kline<br>et al <sup>3</sup> ,1979 | Pilotti<br>et al <sup>17</sup> ,1982 | Bell<br>et al <sup>9</sup> ,1983 | Zajdela<br>et al <sup>18</sup> ,1975 | Wollenberg<br>et al <sup>4</sup> ,1985 | Barrows<br>et al <sup>19</sup> , 1986 | Hammond<br>etal <sup>6</sup> , 1987 | Ulanow<br>et al <sup>20</sup> , 1984 | Present study |
|---------------------------|-----------------------------------|--------------------------------------|----------------------------------|--------------------------------------|--|---------------------------------------|-------------------------------------|--------------------------------------|---------------|
| Total no. cases           | 3545                              | 4834                                 | 1680                             | 2772                                 | 321                                    | 1283                                  | 678                                 | 449                                  | 113           |
| Controlled cases          | 1084                              | 1173                                 | 584                              | 2772                                 | 184                                    | 1283                                  | 159                                 | 318                                  | 113           |
| True positive             | 349                               | 534                                  | 244                              | 1745                                 | 113                                    | 689                                   | 59                                  | 118                                  | 66            |
| True negative             | 735                               | 639                                  | 340                              | 1027                                 | 71                                     | 594                                   | 61                                  | 128                                  | 31            |
| False positive            | 60                                | 11                                   | 112                              | 45                                   | 45                                     | 55                                    | 1                                   | 16                                   | 5             |
| False negative            | 39                                | 175                                  | 42                               | 152                                  | 12                                     | 120                                   | 4                                   | 28                                   | 8             |
| Sensitivity               | 89.9                              | 75.3                                 | 85.3                             | 92                                   | 90.4                                   | 85.2                                  | 94                                  | 87                                   | 89.2          |
| Specificity               | 92.4                              | 98.3                                 | 75.2                             | 95.8                                 | 61.2                                   | 91.5                                  | 98                                  | 88.9                                 | 86.1          |
| Positive predictive value | 85.3                              | 98                                   | 68.5                             | 97.5                                 | 71.5                                   | 92.6                                  | 98                                  | 92.1                                 | 93            |
| Efficiency                | 91.6                              | 86.3                                 | 79.1                             | 93.4                                 | 76.3                                   | 88                                    | 96                                  | 87.8                                 | 88.2          |

This revealed consistency of performance among various institutions with respect to fine needle aspiration cytology of breast lesions. It was concluded by the study that fine needle aspiration cytology is a good diagnostic technique for palpable breast lesions. However, in clinically or cytologically suspicious cases, a repeat fine needle aspiration, frozen -section or excision biopsy should be performed.

## References

1. Palombini, L., Fulcini, F, Vetrani, A. et al. Fine needle aspiration biopsies of breast masses. A critical analysis of 1956 cases in 8 years (1976-1984). *Cancer*, 1 988;61:2273-2277.
2. Kreuzer, G. and Boquoi, E. Aspiration biopsy cytology, mammography and clinical exploration. A modern setup in the diagnosis of tumours of the breast. *Acta Cytol.*, 1 976;20:3 19-323.
3. Kline, T.S., Joshi, L.P. and Neal, H.S. Fine needle aspiration of the breast Diagnosis and pitfalls. A review of 3545 cases. *Cancer*, 1 979;44: 1458-1464.
4. Wollenberg, N.J.,Caya,J.G. and Clowzy,L.J. Fineneedleaspiration cytology of the breast: A review of 321 cases with statistical evaluation. *Acta Cytol.*, 1985;29:425-429.
5. Frable, W. J. Needle aspiration of the breast. *Cancer*, 1 984;53:671 -676.
6. Hammond, S., Keyhani-Rofagha, S. and Otoole, R.V. Statistical analysis of fine needle aspiration cytology of the breast. A review of 678 cases plus 4265 cases from literature. *Acts Cytol.*, I 987;3

1:276-280.

7. Lee, KR., Foster, R.S. and Papillo, J.L. Fine needle aspiration of breast. Importance of aspiration. *Acts Cytol.*, 1987;3 1:281-284.
8. Gajen, R.S. and Gambino, SR. Beyond normality: The predictive value and efficiency of medical diagnosis. New York, John Wiley and sons, 1975.
9. Bell, D.A., Hajdu, S.I., Urban, LA. et al. Role of aspiration cytology in the diagnosis and management of mammary lesions in office practice. *Cancer*, 1983;51:1182-1189.
10. Ahmad, M., Khan, A.H. and Mansoor, A. The pattern of malignant tumours in northern Pakistan. *J. Pak. Med. Assoc.*, 1991 ;4 1:270- 273.
11. Jafarey, NA. and Zaidi, S.H.M. Cancer in Pakistan. *J.Psk. Med. Assoc.*, 1987;37:1 78-83
12. Ahmad, J., Hashmi, M.A., Naveed, IA. et al. Spectrum of malignancies in Faisalabad: 1986-90. *Pak. J. Pathol.*, 1992;3: 103- 110.
13. Memon, MH., Memon, I. and Memon, R.A. The changing pattern of malignant disease in Sind province. *Pak. J. Pathol.*, 1992;3:17- 20.
14. Lstif, SW. and Cheema, V. Fine needle aspiration cytology. *Pak. J. Pathol.*, 1992;3:41 44.
15. Koivuniemi, A.P. Fine needle aspiration biopsy of the breast. *Ann. Clin. Rca.*, 1973;8:272-283.
16. Mamoon, N., Mushtaq, S., Rashid, M. et al. The value of fine needle aspiration biopsy in the management of breast disease. *J. Pak. Med. Assoc.*, 1995;45: 120-122.
17. Pilotti, S., Rilke, F, Del Piano, C. et al. Problems in fine needle aspiration cytology of clinical or mammographically uncertain breast tumours. *Tumori*, 1982;68:407-41 2.
18. Zajdels, A., Ohossein, NA., Pilleron, J.P. et al. The value of aspiration cytology in the diagnosis of breast cancer. Experience at the foundation curie. *Cancer*, 1975;35:499 -506.
19. Harrows, OH., Anderson, J., Lamb, L. et al. Fine needle aspiration of breast cancer. Relationship of clinical factor to cytology results in 689 primary malignancies. *Cancer*, 1986;5 8:1493-1498.
20. Ulanow, R. W., Galbum, L., Canter, J.W. Fine needle aspiration in the diagnosis and management of solid breast lesions. *Am.J.Surg.*, 1984;148:653.657.