

The Experience with Fine Needle Aspiration Cytology in the Management of Palpable Breast Lumps in the University Hospital Kuala Lumpur

C H Yip, FRCS*, G Jayaram, MRCPATH**, S F Alhady, MRCPATH**, *Department of Surgery, **Department of Pathology, University Hospital, 50603 Kuala Lumpur

Summary

A total of 676 palpable breast lumps seen in the Breast Clinic, University Hospital, Kuala Lumpur from August 1993 to August 1994 were subjected to fine needle aspiration cytology. Fifty-four were reported as inadequate, 501 benign, 95 malignant and 26 suspicious. One hundred and eighty-seven aspirates had histological correlation, while 34 of the malignant aspirates had clinical correlation. The majority of the other 455 patients were followed up for a period of 60 to 72 months without any malignancies becoming apparent. For analysis, only the 221 cases with histological or clinical correlation were included, (the suspicious category was included into the positive group and the inadequate cases were excluded), giving a sensitivity of 91.7%, a specificity of 91.7% and a diagnostic accuracy of 91.7%. Breast cytology was an accurate and rapid method of diagnosis of breast diseases, and in a busy surgical unit with limited operating time, it allowed for the triage of patients with breast complaints in deciding which cases needed early open biopsy. A negative cytology does not exclude the possibility of cancer, as there was a false negative rate of 11%. However by utilising a diagnostic triad of clinical examination, radiological assessment and fine needle aspiration cytology, the risk of missing a malignancy is small.

Key Words: Fine needle aspiration cytology, Breast cytology, Breast cancer

Introduction

Fine needle aspiration cytology (FNAC) to diagnose a variety of neoplasms was introduced by Martin and Ellis in 1930¹. This technique was slow to gain acceptance because of the fear of needle track seeding and tumour dissemination. However there is now clear documentation that the recurrence and survival rate in patients who underwent fine needle aspiration cytology is no different from those who did not have the procedure^{2,3}. Currently fine needle aspiration cytology of breast lesions is widely practised and have proven to be a useful diagnostic tool

especially when combined with clinical and radiological evaluation. The major concern has been that an unnecessary mastectomy may be performed due to a false positive report, but false positives are extremely rare, and unless there is obvious clinical and mammographic evidence of malignancy, an excision biopsy with or without frozen section is carried out for histological confirmation. Problems also arise when a specimen is inadequate, or not representative of the lesion due to suboptimal sampling, leading to a false negative result^{4,5,6}. Further evaluation is required if there is

disagreement between the clinical impression and the cytologic diagnosis. The objective of this paper is to study the sensitivity, specificity and diagnostic accuracy of breast cytology in the University Hospital over a 13-month period.

Materials and Methods

From August 1993 to August 1994, a total of 676 fine needle aspirations from all palpable breast lumps seen in the Breast Clinic University Hospital Kuala Lumpur were performed. The aspirations were carried out by the surgeon or cytopathologist using a 22-gauge 1.5 inch needle attached to a 10ml syringe mounted on a syringe holder and fixed in 100% methanol for 20 minutes. The aspirate was reported by two cytopathologists, and grouped into 4 categories i.e. inadequate, benign, malignant or suspicious. One hundred and eighty-seven cases eventually had surgery for histological confirmation, while 34 cases which were clinically and cytologically malignant were not operated on. Only these 221 cases were included in the analysis to determine the sensitivity, specificity and diagnostic accuracy of breast cytology in our centre.

Table I
Breast Cytology in the University Hospital
Kuala Lumpur

Cytology Report	Number	%
Benign	501	74.1
Malignant	95	14.1
Suspicious	26	3.8
Inadequate	54	8.0
Total	676	

Results

Out of the 676 aspirates, 58 (8.0%) were inadequate (Table I) 501 aspirates (74.1%) were benign. Only 100 of these were subjected to excision biopsy, (Table II) either because the patients wanted the lump excised or there was clinical or radiological suspicion of malignancy, and 11 were found to be malignant (9 infiltrating ductal carcinomas and 2 ductal carcinoma-in-situ) giving a false negative rate of 11%. These false negatives were due to an interpretation error in one case and non-representative sampling in the others.

Table II
Correlation of Breast Cytology and Histopathologic Findings

Breast Cytology Report	No Biopsied	Histopathology Report	
		Benign	Malignant
Benign	100	89	11
Suspicious	26	8	18
Malignant	61	1	60
Total	187	98	89

* For analysis, 34 clinically malignant cases and suspicious group was added to the positive group.

Total positive = 121 Total negative = 100

False positive = 9 False negative = 11

Sensitivity = $\frac{\text{Total positive}}{\text{Total positive} + \text{False negative}} \times 100\%$

Specificity = $\frac{\text{Total negative}}{\text{Total negative} + \text{False positive}} \times 100\%$

Diagnostic accuracy = $\frac{\text{Total negative} + \text{Total positive}}{\text{Total negative} + \text{False positive} + \text{Total positive} + \text{False negative}} \times 100\%$

Predictive value of a positive result = $\frac{\text{Total positive}}{\text{Total positive} + \text{False positive}} \times 100\%$

Predictive value of a negative result = $\frac{\text{Total negative}}{\text{Total negative} + \text{False negative}} \times 100\%$

The majority of the other cases were followed up for a period of 60 to 72 months without any malignancies becoming apparent.

Ninety-five specimens (14.1%) were interpreted as malignant. 61 were subjected to histologic confirmation while 34 were clinically malignant and not operated on because they were too advanced locally or metastatic (22 cases), refused surgery (11 cases) or too ill for surgery (1 case). There was one false positive among these cases, giving a false positive rate of 1.05%. This false positive was due to interpretation error.

Twenty-six specimens (3.8%) were interpreted as suspicious. Out of these cases, 18 (69.2%) were eventually proven to be malignant on further evaluation (repeat FNAC in 7 patients, frozen section in 1 patient, core needle biopsy in 3 patients, and excision biopsy in 7 patients). The other 8 patients were proven to be benign by excision biopsy.

For calculation of the sensitivity, specificity and diagnostic accuracy, specimens have to be grouped into positive or negative. (Table II) In this study, only the 187 cases with histological confirmation and the 34 positive cases which were clinically malignant were included in the analysis. The 'suspicious' category was included in the positive category, giving a sensitivity of 91.7%, a specificity of 91.7% and a diagnostic accuracy of 91.7%. The positive predictive value was 93% and the negative predictive value was 90.1%.

Discussion

As a diagnostic modality, fine needle aspiration cytology has many advantages^{4,7,8}. It is painless and does not leave a scar. It is rapid to perform, can be done in the out-patient clinic and is economical. It has been shown to be significantly better than core needle biopsies^{9,10} and also superior to clinical examination and mammography in the diagnosis of breast lumps^{3,9,11}.

Another advantage is the rapidity of diagnosis. Immediate staining and reporting can provide a reliable diagnosis within a quarter of an hour^{12,13}. The patient can thus be informed about the diagnosis during a single clinic visit. When the breast lump is a cyst, aspiration is therapeutic

as well as diagnostic. When the cystic fluid is not blood-stained and there is no residual lump after aspiration, the patient can be reassured. When a definite diagnosis of malignancy is made, the woman has time to prepare herself emotionally and to discuss therapeutic options.

Inadequate aspirates comprised 8.0% of the total. These are aspirates which contain few or no epithelial cells, and can range from 11.9 - 15% in benign conditions and 3.3% in malignant lesions^{6,12}. If immediate staining and screening could be carried out, this number can be reduced, as a repeat aspirate can be done immediately^{12,14}.

The suspicious classification comprised 3.8% of the total number in this study. This is low compared to other series, where this category ranged from 0.6 to 14%^{3,7,14,15,16}. This group is important as it allows the cytopathologist a classification in cases where all the criteria for malignancy is not met, but there is some doubt as to the benign nature^{3,12}.

A major disadvantage of fine needle aspiration cytology is that it is not 100% accurate. False negative rates ranging from 0.7 to 22% have been reported, as well as false positive rates ranging from 0 to 4%^{4,7,8,16,17}. To decrease the incidence of false negative and false positive results, the aspirate needs to be interpreted by an experienced cytopathologist. Ultrasound-guided fine needle aspirate especially where the lump is diffuse may reduce the incidence of false negatives from sampling errors. There is always the worry that an inadvertent mastectomy may be performed based on a false positive cytology, or a false negative cytology may lead to delay in the diagnosis of malignancy, but when combined with clinical examination and radiological assessment, this possibility is very small¹⁸. Out of the 11 false negative results in this study, only three patients had the diagnosis of breast cancer delayed for more than 3 months. The others went on to have further evaluation due to clinical or radiological suspicion of malignancy. It has been shown that frozen section also has a false negative rate of 4% and a false positive rate of 0.1 - 0.2%^{16,17}. The false negative rate of 11% and true false positive rate of 1.05% (if we exclude the suspicious category) in this study is acceptable. If the false negative rate was calculated using all 501 benign cytology reports, it would drop to 2.2%.

Overall, we have achieved a sensitivity of 91.7%, and a specificity of 91.7% in breast cytology, with an overall diagnostic accuracy of 91.7%. This is comparable to the sensitivity range of 80 - 99%, the specificity range of 88 - 100% and the diagnostic accuracy of 84 - 99.5% reported in other series^{4,11,14,15,16,17,19,20}. Fine needle aspiration cytology (excluding the suspicious category) also picked up 76.4% of the total number of malignancies (94 out of 123 malignancies), comparing well with the rate of 64 - 90% reported^{7,16,17,19}.

Whether or not a mastectomy can be performed based on a cytological diagnosis of malignancy remains an unanswered question^{3,5}. There are surgeons who feel that a frozen section biopsy is mandatory before definitive surgery to eliminate the possibility of an unnecessary mastectomy being carried out due to a false positive result²⁰, while others feel that with a positive cytology, coupled with clinical and radiological suspicion of malignancy, primary surgery without histological confirmation is an expeditious approach^{3,16,17}. In our practice, if the clinical and radiological picture did not fit in with a cytological diagnosis of malignancy, review of the case by the surgeon and the cytopathologist, and an excision biopsy with or without frozen section was carried out prior to definitive surgery.

In a busy surgical unit, where the waiting time for an elective operation can stretch for months, fine needle aspiration cytology serves as a method of triage to decide

who needs an urgent open biopsy. If the clinical diagnosis correlates with a benign cytology report, the patient can be followed up and a repeat aspirate done if required. This would decrease the number of open breast biopsies done^{21,22}. In this study, only 20% of the patients with benign cytology reports were subjected to open biopsies.

Breast cytology needs to be combined with clinical evaluation, and radiological assessment i.e. mammography and ultrasonography in the older women, and ultrasonography in younger women, to decide who needs an open breast biopsy, a frozen section biopsy, or a mastectomy without a confirmatory breast biopsy. The use of this diagnostic triad (clinical examination, radiological assessment and FNAC) is rapidly gaining momentum in the evaluation of patients with breast lesions³ and is the standard procedure carried out in breast clinics.

Conclusion

Fine needle aspiration cytology of the breast has been shown to have a high sensitivity, specificity and diagnostic accuracy in the University Hospital Kuala Lumpur. With a clinical and radiological diagnosis of breast cancer, confirmation of the malignancy by breast cytology would mean that definitive surgery can be carried out without a prior excision biopsy.

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