

Fine needle aspiration cytology of breast lesions: Diagnostic values

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Summary:

Back ground: Fine needle aspiration (FNA) is indicated in the exploration of superficial and deep masses. The accuracy of this procedure differs in various studies, and according to the organ explored. Palpable mammary masses of concern to the patient or clinician should be aspirated, regardless of imaging findings.

Objective: The present study aimed at evaluation of cytological results of FNA of different palpable breast lesions, using histopathological diagnosis as the gold standard for final diagnosis.

Patients & Methods: This prospective study includes 289 females with palpable breast lesions. FNA aspiration was conducted in a private out patient clinic during the period of 1994-2004. The cytological results of aspirated masses are compared with the histopathological result of biopsies or surgical specimens. Estimation and evaluation of the validity parameters of cytology and histopathology were performed.

Results: Out of seventy one (71) cases of malignant neoplasms diagnosed in histopathological; sixty three (63) showed malignant cellular aspirates, four (4) showed atypical cellular changes and four (4) were negative for significant cellular findings on FNA. On the other hand out of (217) benign lesions diagnosed by histopathology; 15 showed atypical epithelial changes on cytological aspirates while the rest showed benign cellular aspirates. Twenty (20) cases out of the whole sample showed epithelial cellular atypia on FNA; four of them proved to be malignant, one case revealed atypical epithelial hyperplasia or epitheliosis, and the other 15 proved to be benign lesions by histopathology. The validity parameters of FNA were as follows; sensitivity= 88.7%, specificity= 100%, False negative results= 11.3% and accuracy= 96.1%.

Conclusion: F. N. A. is a quick, inexpensive, relatively painless safe procedure from which results can be obtained in a short time with the other supportive investigations. Adequacy determination must be based not only on the cytological findings but also on their correlation with the clinical, mammographic, and ultrasonic findings to avoid false negative results. Atypical epithelial changes on cytological smears indicate the need for immediate excisional biopsy.

Introduction:

Each breast lesion mandates meaningful examination, regardless of patient age. FNA provides a safe, cost-effective procedure, appropriate for office evaluation that finds ready patient acceptance. ⁽¹⁾ Fine needle aspiration cytology (FNAC) of breast lumps is an important part of the triple assessment of the palpable breast hump (clinical examination, imaging, [mammography or ultrasound], and FNAC). It has been shown

that FNAC can reduce the number of open breast biopsies. ^(1,2,3) However, some

patients find FNAC' painful, it can be associated with haematoma formation, and if performed before mammography can make radiological assessment of the breast more difficult. It is also possible that no cells are harvested making cytological analysis impossible. These are described as inadequate aspirates and rates vary markedly. ⁽⁴⁾ This article reviews our experience with fine needle aspiration cytology of the breast since 1994 to 2004 with particular reference to:

A- Preparation of specimens.

B- Cytopathology, histopathology of benign and malignant lesions. C- Advantages of the procedure.

Patients & methods:

This prospective study was conducted for 289 case of fine needle aspirations used for different breast masses. The cytological results were compared with the final histopathological results of biopsies or surgical specimens taken from the patients. The surgeon or cytologist performed all of the breast aspirations, which is most practical in our situation.

The equipment needed to perform fine needle aspiration cytology of the breast is simple: 1-5 or 10 ml disposable plastic syringe.

2-22or 23 gauge, 0.6-1 mm disposable needles.

3-Alcohol skin preparation sponge & sterile gauze pads. 4-Microscope glass slides.

The aspirations are carried out without local anesthesia. After cleansing the skin over the lesion, insert the needle into the lesion and move the needle backward and forward in several directions while maintaining strong suction. The moment any aspirate is visible in the "transparent" hub of the needle, release the suction, withdraw

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the needle and syringe, detach the needle from the syringe, fill the syringe with air, reattach the needle, express a drop of the aspirate on the center of the slide, and prepare the smear. Two types of smears obtained:

1- Air-dried, later stained with a Romanowsky method.

2- Wet-fixed in 95% ethyl alcohol, stained by Haematoxylin and Eosin stain. The histopathology of the surgical specimens obtained from the same patients were analysed and the results were compared.

Result:

The total number of malignant cases in histopathology of tissue biopsies were (71): 63 have positive malignant cells in cytological smears, 4 have benign cellular smears while 4 showed atypical cells on FNA.

The total number of benign lesions in histopathology were (217) case including fibroadenomas 78 (36%), fibroadenosis 34 (16.5%), duct ectasia 61 (26.5%), benign cystic masses 42 (19.5%) (27 fibrocystic, 11 abscesses, 4 galactoceles), one case of granulomatous mastitis in addition one case found to be lipoma. These lesions showed benign cellular aspirates except 15 case showed atypical cellular changes on FNA.

Out of (20) cases showed atypical epithelial cells on FNA, four proved to have malignant tumors, 15 found to have benign lesions and one case found to have atypical epitheliosis in histopathology.

The results was as such, the sensitivity= 88.7%, specificity= 100%, false negative results=11.3 % and accuracy=96.1

Discussion:

Benign diagnoses based on FNA in this study gave a high degree of correlation with tissue sections. The false negative results of malignant cases were 11.3%. Falsenegative interpretations range from 2%-9% in different studies. (5) These are attributable mainly to composition of the neoplasm, size of the tumor and lack of attention to the constituents of adequacy. Unsatisfactory specimens or those with sparse cellularity are a primary cause of false-negative results. So evaluation of specimen adequacy should be the first step in the microscopic evaluation of the cytological smear. The 1996 National cancer institute (NCI) conference provided consensus on a key point: that adequacy determination must be based not only on the cytological findings but also on their correlation with the clinical and mammographic findings. In review of 100 malignant tumors with false-negative results, 58% were due to lack or apparent lack of tumor

cells because of either desmoplasia or small-sized malignant cells. So decision-making must be based on the clinical-pathologist partnership; the interpreter must have knowledge of the patient's history (familial risk, prior breast lesion, duration of lesion), clinical findings (size, location, appearance, mobility), resistance of the lesion to the aspiration needle, the amount and appearance of the material that is expelled onto the glass slides and imaging characteristics. (5) FNAC should never replace clinical judgment or exclude an indicated tissue biopsy.

It is a controversial matter as to whether a biopsy should also be performed after a negative aspiration result without any suspicion on clinical or radiological bases.

What is the value of interpreting atypical epithelial cells in cytological smears? Four smears or aspirates from 20 patients showed atypical epithelial cells in this study proved to have malignant tumors and one case have atypical epithelial hyperplasia on histopathology. So excisional biopsy in these cases is recommended to exclude or confirm malignancy. Also atypical epithelial hyperplasia in histopathology dose has a clinically significant increased risk for future invasive breast carcinoma (5 times) and therefore it would be optimal to provide this diagnosis. (5,6) The suspicious report as in the NCI recommendations (7), indicated the need for immediate excision and is used for:

- a. Cells lacking some malignant criteria.
- b. Insufficient numbers of abnormal cells.
- c. Poorly preserved abnormal cells.
- d. Abnormal cells that cannot be categorized.
- e. Atypical cells, poorly visualized because of inflammation, blood, or debris.

All the cases with positive malignant cells in cytological smears in this study show malignant tumors in histopathology. The advantages of obtaining a positive diagnosis of breast cancer on a fine needle aspirate are as follows:

1- F. N. A. is a quick, inexpensive, relatively painless safe procedure from which results can be obtained in a short time with the other supportive ultrasound and mammography.

2- A rapid positive diagnosis provided by aspiration cytology enables the clinician to counsel an anxious patient without her having to wait for what is often a considerable time for the results of an open biopsy.

3- A surgeon can perform pre operative assessment and testes on an outpatient basis to detect the presence of metastatic cancer and to arrange for definitive treatment without delay.

4- When patients are to be operated on, a pre operative diagnosis allows the operating - room staff to plan for the type of operation to be carried out and decreases the time that the patient spends in the operating room, including time spent under

anesthesia.

5. In addition, material procured from FNA of malignant breast tumors can be evaluated by ancillary studies for prognostic factors, including estrogen and progesterone receptor status, (8) DNA ploidy, (9) and HER2/neu expression. (10)

However, there are limitations for FNA, like the false negative aspirates, some mild complications like hematoma, and the precise diagnoses of the specific types and subtype of malignancies and the difficulties to differentiate infiltrating carcinoma from DCIS in FNA material, the consensus is that DCIS and infiltrating carcinoma cannot often be differentiated easily in aspiration material. (5,11,12,13)

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