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Correlation between histopathologic and fine needle aspiration cytology diagnosis of palpable breast lesions: a five-year review

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Summary

Fine needle aspiration cytology (FNAC) of the breast has been used as an initial investigative procedure of palpable breast lesions. The purpose of this study is to evaluate our experience with Fine Needle Aspiration Cytology (FNAC) and to correlate between histopathologic and FNAC diagnoses of palpable breast lesions. A 5-year retrospective study was performed using records of all patients who had had both FNAC and histopathologic results of breast lumps. This is a retrospective study of 220 diagnosed cases of breast lesion at the University of Maiduguri Teaching Hospital (UMTH), Nigeria between the periods of January 2001 and December 2005. The results of the FNAC were interpreted as inflammatory, benign, suspicious or malignant. A total of 220 patients had both cytopathologic and histopathologic diagnoses and therefore fulfilled the criteria for this study. There were 11(5%) cases of inflammatory, 140(63.6%) cases of benign and 69(31.4%) cases of malignancy. There were two cases that were suspicious of malignancy and for the purpose of this study were considered as malignant. There were five (5) cases of cytologically interpreted errors which were three cases of false negative and two cases of false positive. The diagnostic accuracy was 97.7%, sensitivity was 95.7%; and specificity was 98.7%. The false negative and false positive rates were 2.9% and 1.9% respectively. FNAC of breast lesions is sensitive, specific, and highly accurate as the initial investigation of palpable breast lesions in our tertiary hospital. We therefore implore clinicians to embrace this procedure in the management of patients.

Keywords: FNAC, cytopathologic, histopathologic, diagnosis, correlation, breast lesion.

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Résumé

Cytologie à l'aide de l'aiguille aspiratoire (FNAC) des mamelles a été utilisée comme une procédure d'investigation initiale d'examen des lésions des mamelles. Le but de cette étude était d'évaluer notre expérience avec la Cytologie à l'aide de l'aiguille fine (FNAC) et faire une corrélation entre histopathologie et le diagnostic FNAC palpable des lésions des mamelles. Une étude rétrospective sur 5 ans était faite utilisant les registres des patients qui avaient eu des résultats du FNAC et histopathologique des mamelles. Cette étude rétrospective de 220 cas diagnostiqués de lésions des mamelles au Centre Universitaire Hospitalier de Maiduguri (UMTH), Nigeria entre Janvier 2001 à Décembre 2005. Les résultats de la FNAC étaient interprétés comme inflammation, bénigne, suspicieux. Au totale 220 patients avaient une diagnostic cytopathologique et histopathologique et satisfaisant les critères de cette étude. Ils avaient 11(5%) des cas d'inflammation, 140(63.6%) cas bénigne et 69(31.4%) cas maligne. Ils avaient 2 cas suspicieux de maligne et considéré pour cette étude. Ils avaient cinq cas d'erreurs cytologiquement interprété parmi lesquels trois cas étaient négative et deux cas positifs. Le diagnostic précis était de 97.7%, une sensibilité de 95.7%; et une spécificité de 98.7%. Les taux de prévalence négatif et positif étaient de 2.9% et 1.9% respectivement. Le test du FNAC des lésions des mamelles est sensible, spécifique et plus précis comme investigation initiale des lésions palpable des mamelles dans notre hôpital tertiaire. Nous implorons aux médecins d'embrasser cette procédure dans le management des patients.

Introduction

The breast is one of the organs that are readily accessible for fine needle aspiration biopsy [1]. The technique for breast aspiration is simple, rapid, minimally invasive, cost-effective and free of major complications. It is an efficient method of diagnosis [2-4]. The triple test approach which includes; physical examination, mammography and fine needle

aspiration being studied have been found to increase sensitivity and specificity over that of any one test alone [5].

Fine needle aspiration cytology (FNAC) of the breast is gaining popularity among the pathologists and clinicians at the University of Maiduguri Teaching Hospital (UMTH). A previous study in the same centre by Pindiga *et al* [6], with sample size much smaller than that of the present study shows a diagnostic accuracy of 97% and specificity of 87%. Therefore, it is the initial investigation of choice in the management of palpable breast diseases in our centre. This study is aimed at evaluating our experience in the diagnosis of palpable breast lesions by FNAC and surgical biopsy.

Materials and methods

This is a retrospective study of 220 diagnosed cases of breast lesions at the University of Maiduguri Teaching Hospital (UMTH), Nigeria between the periods of January 2001 and December 2005. A total of 243 and 376 patients with breast lumps had FNAC and surgical biopsies respectively. However, 220 patients had both FNAC and surgical biopsies independently. The difference in numbers was that 23 patients had FNAC but could not account for the surgical biopsies while 156 patients had surgical biopsies without having FNAC. The case notes were retrieved and information about the Age, Sex, FNAC and histological diagnoses were extracted. The duplicate copies of all histological and cytopathological reports and their corresponding original slides were retrieved and reviewed. The only inclusion criterion for this study is that each patient must have had both FNAC and histopathological diagnoses. The data was analyzed using simple statistical tables..

Procedure

During the period of study, all patients were referred by the surgeons to histopathology department for FNAC. The procedure is explained to the patient and verbal consent is usually given. The pathologists examine the lesion and the skin over the lesion is clean with alcohol wipe. One of the hands is used to feel and steady the lump, the other hand is free to hold and manipulate the plastic disposable syringe of a 20ml and 23-25 gauge disposable needle 1½ inches long. A fine-needle was then pushed quickly through the skin at right angles to it and immediately on into the lump. The syringe is then draw back to create a negative pressure as required. The needle tip is moved back and forth and the needle is angled to sample

different areas of the lesion without removing the needle from the skin. As soon as the material is seen in the hub of the needle, the negative pressure is released and the needle along with its sample is withdrawn. The assistant then press firmly against the aspiration site with dry cotton for about a minute. The smear is made by spreading the content of the needle on the four labelled glass slides immediately spread and 2 slides are fixed immediately in 95% ethyl alcohol for about 30 minutes while the remaining two are air dried. The slides were stained with Papanicolaou stain or Haematoxylin and Eosin (H&E), and MayGrunwald Giemsa (MGG) stains respectively. Destrene Polyethylene Xylene (DPX) mountant placed on top of the smear and covered with a cover slip. Finally the pathologist examines the slide under the binocular light microscope. The pathologists repeated the smear in any situation where the smear was inadequate. The microscopic diagnostic interpretation includes:- Inflammatory, Benign, Suspicious and Malignant.

Results

A total of 220 patients had both cytopathologic and histopathologic diagnoses of breast lesions independently within a five-year study period.

Table 1 shows the histological types of breast lesions with 151(68.6%) benign cases and 69 (31.4%) malignant cases. The inflammatory lesions and suspicious cases were considered as benign and malignant respectively.

Table 1: Cytopathological diagnosis of 220 cases of Breast lesions.

Cytopathologic Diagnosis	No of cases (%)
Inflammatory	11 (5)*
Benign	140 (63.6)
Suspicious	2 (0.9)**
Malignant	67 (30.5)
Total	220 (100)

* Inflammatory lesions were considered benign.

** Suspicious lesions were considered uncertain for malignancy

Table 2 shows the interpretation errors and these include three (3) false negative and two (2) false positive results. The false negative results were those that were cytopathologically reported as benign but which were found to be malignant histologically. The false positive results were those that were

reported as suspicious for malignancy cytopathologically but found to be benign histologically.

Table 2: The five cases of interpretation errors.

Cytopathologic diagnosis	Histopathologic diagnosis
False Negative	
Benign	Invasive lobular carcinoma
Benign	Invasive lobular carcinoma
Benign	Ductal carcinoma in situ (Non-comedo variant)
False Positive	
Suspicious	Fibrocytic change (Severe Epithelial Hyperplasia)
Suspicious	Tubular adenoma

Table 3 shows the summary of the cytologic and histologic correlation of the 220 cases.

Table 3: Summary of 220 cases of FNA Cytology with histopathological correlation

Diagnostic accuracy	97.7%
Sensitivity	95.7%
Specificity	98.7%
False Negative Rate	2.9%
False Positive Rate	1.9%
Positive Predictive Value	97.1%
Negative Predictive Value	98%

Discussion

Breast diseases are common in our environment and being a tertiary hospital in the North-eastern sub-region of Nigeria more cases are referrals from other hospitals and clinics. A recent study in Maiduguri shows that cancer of the female breast is the second most common malignancy in the general population [7]. Patients were referred for FNAC and subsequently for tissue biopsy diagnosis for various breast lumps. FNA of breast lesions is becoming popular among the pathologists and clinicians in UMTH in recent time.

The value for any diagnostic test lies on its sensitivity and specificity. Sensitivity is defined as the ability to detect the presence of disease when it is present while specificity is defined as the ability to determine the absence of the disease when it is not present. The FNAC of the breast is reported to have an average sensitivity of 87% and specificity of 98% to 100%, and negative predictive value of 87% to

99% [8,9]. This study shows a sensitivity of 95.7% and specificity of 98.7% which is highly comparable to the above studies.

The predictive value for the FNAC test was how confident the pathologist was assigning or definitive of the diagnosis. The positive predictive and negative predictive values are the proportion of the patients with positive and negative test results who are correctly diagnosed respectively. In this study, the PPV and NPV were 97.1% and 98% which means that FNAC is a highly accurate and predictive tool in diagnosis. Ergete [10] recorded PPV and NPV of 89% and 94% in his study while Mohammed *et al* [11] documented PPV of 100%.

A false negative result means missed malignancy. False negative rates generally vary from 0 to 4.2% [10]. The false negative rate is defined as the percentage of patients with benign cytology in whom malignant lesions are later confirmed on tissue biopsy. In our series the False Negative Rate was 2.9% which is comparable to other studies [8,9,10,11]. However, failed or inadequate aspirations were not recorded in this study because such procedure is immediately repeated by the pathologists. There were two cases of invasive lobular carcinoma which showed paucicellular smears with uniform cells and lacking atypia. This is probably related to the degree of fibrosis as documented by Kline *et al* [12]. The ductal carcinoma in situ was missed because of diagnostic error of the monomorphic cytomorphic nature of the malignant cells.

A false positive diagnosis indicates that a patient with malignant FNA results was found on histopathologic examination to have benign lesions. The false positive rate in our series was 1.9% which is also comparable with other studies that vary from 0.1% to 1.8% [8,13]. The issue of false positivity is not unique for FNAC alone but also for tru-cut needle biopsy [14]. The fibrocytic change (severe epithelial hyperplasia) and tubular adenoma were suspected as malignant but histopathologically confirmed as benign. This interpretation error was due to the cellularity and atypia of the smears.

The overall diagnostic accuracy for malignancy was 97.7% which is also comparable with other studies [10]. However, tissue biopsy diagnosis still remains the gold standard.

In conclusion, the value of FNAC in the diagnosis and management of breast lesions cannot be overemphasized because of its accuracy, sensitivity and specificity. We therefore employ our colleagues to embrace this procedure as a pre-operative investigation of palpable breast lesions.

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