Original Article

Diagnosis of Breast Cancer: is there any protocol which is applicable worldwide?

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Abstract:

Objectives: to study the accuracy of cytopathology and to evaluate it as diagnostic pathological tool in breast diseases.

Method: a prospective study in the period between Jan 2006 and Feb 2008. Data were analysed using the SPSS. Sensitivity, specificity and accuracy were calculated and compared to literature.

Results: Total number of reports was 542, 271 for each cytopathology and histopathology. The overall mean age was 41.0+ 15.3 (ranging between 14- 80) years.

The overall sensitivity, specificity and accuracy of cytopathology were 56.1, 80.9 and 63.8% respectively while those of histopathology were 93.5, 83.5 and 89.7% respectively.

Conclusion: FNAC has low sensitivity, specificity and accuracy.

Key Words: FNAC, breast cancer.

Breast cancer is the commonest female malignancy worldwide[1]. The best outcome is achieved with early detection of small or impalpable lumps.

For effective management, multidisciplinary approach is essential[2]. Many diagnostic tools are used in cases of suspected breast cancer as the famous triple assessment which was described in 1975[3] and it reduces dramatically the use of open biopsy[3,4]. It was used principally for evaluating palpable breast lumps. Triple test includes clinical assessment, mammography or ultrasonography and fine needle aspiration (FNA)[3,5].

FNA cytology (FNAC) is an established tool in diagnosing palpable breast lumps[6] and alongside with clinical and radiological assessment, it is used in diagnosing symptomatic breast cancer. Although FNAC is cheap, rapid and accurate but studies show that histologic diagnosis using core biopsy is more sensitive and specific. The latter diagnoses benign lesions, assesses the invasion and grade of cancer and shows the subtype as well[6].

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Studies show that FNAC is accurate and cost effective but sometimes cannot be the isolated pathological diagnosis. It has some limitations and the sample obtained may be inadequate[7].

Some prognostic factors like grading can be described in FNAC as in core biopsy but tumour architecture is less described by FNAC while vascular invasion and tumour size cannot be accurately described by small samples[8].

Even intraoperatively, imprint cytology can be used for assessing breast tumours and sentinel lymph nodes as well. Imprint cytology is rapid, preserves the tissue for permanent section and provides clear details[9,10].

The National Health Service Breast Screening Programme (NHSBSP) was introduced in 1988 and it offered three-yearly mammography for women between 50- 64 years of age. The latter had reduced the mortality by 20%. Then the cytopathologists provided FNA for lesions in ladies referred with mammographic abnormalities. By 1992, as many as 62% of breast cancer patients were diagnosed by FNA or core needle biopsy only i.e. there was a great reduction in open biopsy rate[11].

Alternatives:

In spite of their better results, many are now replacing FNA with core needle biopsy by using the trucut biopsy. It shows variable ranges of sensitivity, specificity and accuracy but in the experienced hands it provides a suitable sized mass for histological assessment and most of the advantages of histopathological assessment with negligible complications. In a study done in early 1980s in New York, tru-cut needle biopsy showed overall sensitivity of 89% in diagnosing breast cancer, and 94% in masses more than 2.5 cm, and specificity of 100%[12]. Some showed better sensitivity and accuracy with FNA in comparison with Tru-Cut needle biopsy[13].

Local Data:

Sudan is the largest country in Africa and Arab world with an area of about a million square miles. By the year 1999, the population density was 30,326,000; about fifth (5,730,000) of them lived in the capital city Khartoum as shown in the last census[14]. The population number is expected to be more in the coming census for this year. Sudan is divided into 26 states but the pathologists are concentrated mainly in the big cities and the number of cytologists or the histopathologists who are interested in cytology is not proportional with the medical service.

In a study done by J B Lynch et al about "Cancer in the Sudan" in the period between 1954- 1961, breast cancer specimens represented 11.68% among a total of 2,234 different tumours received for histological examination in that period. It was the third malignancy following skin and female genital tract cancers. This difference in cancer pattern at that period of time may have resulted from the personal selection of tumours sent for histological examination![15].

In Sudan, in few central hospitals there are related or attached pathology departments. Most of the histopathology and cytopathology are done in separate external laboratories according to the surgeon or physician preference. In Khartoum there is one national health laboratory (Stack) and it is directed by the Federal Ministry of Health. There are many private laboratories.

Objective:

To study the sensitivity, specificity and accuracy of cytopathology in diagnosing breast pathology, to compare cytopathology with histopathology and to evaluate the cytopathology as a diagnostic tool of breast cancer.

Patients and Methods:

This is a prospective study in Khartoum in the period between January 2006 and February 2008. A total number of 542 patients were enrolled in the study. They were of equal numbers of cytopathology and histopatholgy. A computer-based questionnaire was filled for each patient included personal data, site, clinical presentation and diagnosis, type of biopsy and the detailed results, correlation between the clinical, pathological and final diagnosis ....etc. The data were analyzed using SPSS, Microsoft Excel and Statistics calculator.

Results:

The total number of reports studied was 542; 271 for each cytopathology and histopathology. Males to females were 2: 55. The overall mean age ± standard deviation (SD) was 41.0± 15.3 (ranging between 14-80) years; females were younger than males with mean age± SD of 40.6+ 15.1 (ranging between 14- 80) years while males were of mean age± SD 50.6± 16.7 (ranging between 22- 73) years. Of the total, 368 were clinically malignant (330 diagnosed clinically as malignant and 38 were suspicious but with equivocal clinical findings), seven inflammatory and the remainder were clinically benign lesions.

Among the 271 cytopathology, only five were taken from nipple discharge and the remainder were freehand (non-guided or assisted) samples. Most of the histopathology samples (135) were achieved by excisional biopsy and mastectomy samples (123), while 10 were by quadrentectomies and trucut needle biopsies were only three.

The overall sensitivity, specificity and accuracy of cytopathology were 56.1, 80.9 and 63.8% respectively while those of histopathology were 93.5, 83.5 and 89.7% respectively.

In cytopathology, about 13% of the reports were deficient in either raising more differential diagnoses or being rather descriptive than being conclusive. On the other hand, 12.9% of the proven cytologically malignancy reported invasion i.e. invasive ductal carcinoma.

Of incisional and excisional biopsies 6.9% requested another biopsy. In histopathology reports 6.8% of the true positive reports were deficient. In cases of mastectomy and quadrentectomy; 26.3% didn't report about grading, 60.5% didn't mention about differentiation while 18.4% didn't mention about the involvement of the margins. Table 1 summaries the results.

Table (1): Comparison of sensitivity, specificity and accuracy of FNAC in diagnosis of breast pathology between this study & other studies

Reference	Year of Pub.	Country or City	Number of Patients	Sensitivity	Specificity	Accuracy
Green B et al (4)	1995	UK	728	98.9%	99.6%	-
Scopa C D et al (13)	1996	Greece	215/ 209	90%	100%	94%
Feichter G E et al (16)	1997	Basel, SUISSE	1,472	89.9%	99.3%	88.5%
El Tahir A et al (5)**	1999	UK	1110	93.5%	98.1%	-
Yong W S et al (21)	1999	Singapore	39	-	-	90%
Daltrey I et al (19)	1999		59	88- 92%	-	-
Donley H et al (8)	2000	UK	NHSBSP	74- 96%	100%	-
Motomura K et al (10)**	2000	Japan	111	96%	90.8%	92.1%
Homesh N Aet al (1)	2005	Yemen	296	66.7%	81.8%	75.7%
Ueno E et al (17)***	2005	Japan	58	92.7%	76.9%	88.9%
Hiregoudar Abijit D et al9	2006	India	40	95.24%	100%	100% b 97.5% m
Akçil M et al (18)*	2008	Turkey	25 studies	78- 100%	76- 100%	-
Alkuwari E & Auger M (20)	2008	Canada	115	65%	100%	-
Musa MT& Khair R ZA	2008	Sudan	271	56.1%	80.9%	63.8%

NHSBSP: **N**ational **H**ealth **S**ervice **B**reast **S**creening **P**rogram, b: benign, m malignant, *: review of studies, **: intraoperative imprint cytology, ***: ultrasound-guided
Year of Pub.= Year of publication

Discussion:

In our country, most of the medical practitioners are trying to follow the triple assessment protocol in cases when breast cancer is suspected. The cornerstones are the clinical and pathological assessment, while imaging, including mammography or breast ultrasound, is not routine especially in discrete, peripheral or small hospitals. Hence the breast management protocol is mainly by "double" assessment.

In this study the sensitivity, specificity and accuracy[1,4,5,8-10,13,16-21)] were significantly less than most of the recent studies in different parts of the world. On the other hand the specificity was comparable to some of these studies[1,18] and even more than some[17].

FNAC had reduced the number of operations in benign breast lumps which can be left in situ when confirmed pathologically[4]. It also improved the selection of patients for biopsy and saved time in the clinical management of breast lesions[16]. Hence reasonable sensitivity, specificity and accuracy are needed for safe application of this important diagnostic tool.

The experiences of "one-stop" breast clinics provide an accurate diagnostic tool for symptomatic breast diseases[5]. It can obviously reduce the time, cost and patients exhaustion and increases the experience of the clinicians and the concerned medical staff. Most of the hospitals in Sudan are deprived of such specialized clinics.

Histopathology is known to have a better way in assessment of most of the prognostic factors which are not assessed by the FNAC e.g. the presence of invasion. Needle core biopsy[1,8] is more invasive and more accurate tool with negligible complications. In our study there are only three trucut biopsies. The latter is not widely available and the cost of the needle will add extra cost to the patient!

In this study, sensitivity, specificity and accuracy of cytopathology are significantly less than histopathology.

The reliability of cytopathology is influenced significantly by many factors as the adequacy of the reports, the suspicious ways of reporting, raising other more differential diagnoses than confirming or excluding others and recommending excisional biopsies in order to confirm the diagnosis.

Conclusions:

There is no protocol which is fitting worldwide. In the current situation, FNAC is not the most suitable tool to be used in the diagnosis of breast lumps as it is not available in some of the 26 Sudanese states. Core biopsy or trucut needle biopsy are good alternatives when FNAC is not conclusive. In areas where there are no facilities, excisional biopsy is better done than delaying the management. Encouragement of multidisciplinary clinics will improve the practice, experience and hence the health service provided for different states.

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