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Original Article

Concordance Rate between Fine Needle Aspiration Biopsy and Core Needle Biopsy in Breast Lesions

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ABSTRACT

Background and Objectives: **Breast cancer is the most common cancer among women worldwide. Fine needle aspiration biopsy (FNAB) is one of the methods of breast biopsy which is fast, easy and cost effective. The aim of this study was to evaluate the concordance rate between pathologic results of sonography or stereotaxy guided FNAB and guided core needle biopsy (CNB) in the evaluation of breast lesions.**

Materials & Methods: **During December 2010 until March 2011, 36 female patients with 37 breast lesions referred to FNAB and CNB with the guide of sonography in 35 lesions and with the guide of stereotaxy in 2 lesions. The kappa statistic used to calculate the concordance coefficient.**

Results: **The concordance rate between guided – FNAB and guided – CNB was 93% with using kappa coefficient. In 5 patients, subjected to breast surgery, malignancy was reported as well as in guided-FNAB or guided-CNB.**

Conclusion: **Because of high concordance between these two techniques in the assessment of breast lesions, guided FNAB is recommended in the first step. Guided-CNB can be reserved for lesions with insufficient pathology results by guided-FNAB.**

Keyword: **Fine-Needle Aspiration Biopsy, Core Needle Biopsy, Breast**

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Introduction

Breast carcinoma is the most common malignant tumor among women worldwide including Iranian women (1-5). It is the second cause of cancer related death among women in the world. Approximately one-quarter of all patients who diagnosed breast cancer die from this disease (6-8). Despite increasing incidence the annual death rate especially in recent years dropped(1.8% annually from 1998 to 2007) because of screening, early diagnosis and appropriate treatment (9).

For this reason several measures have been taken to provide cancer detection, such as fine needle aspiration biopsy (FNAB). This technique is cost effective; less invasive, more easily done and still have fewer side effects. FNAB is an easy outpatient diagnostic method for evaluation of breast mass especially in experienced hands. For biopsy of a mass we can locate it manually or with guidance of ultrasonography or stereotaxy. In FNAB a very thin and flexible needle with a narrow inner core used to extract fluid or cells from the lesion. This method has some limitations as well: its inability to differentiate between invasive and in situ carcinoma, insufficient samples and false negative results (10 – 16).

Another method of breast mass biopsy is core needle biopsy (CNB) done with a larger needle than used in FNAB to remove tissue sample. Sonographic or stereotactic guided CNB used for all palpable or non- palpable breast mass to increase the accuracy of biopsy. The advantages of CNB are lower inadequate rates, allow the ancillary methods, grading and typing of tumor (in cases of cancer). However, it is more invasive, time – consuming and more expensive (10, 11, 16-20). Now "Triple assessment", including physical examination, imaging and biopsy is accepted as a method for early detection of cancer (12-18, 21).

As already mentioned, FNAB is faster, more cost effective, safer and easier to perform than other methods. Therefore, this study was designed to determine the concordance between pathologic results of FNAB and CNB.

Materials and Methods

This study was done on patients referred to radiologist for the breast mass biopsy from December 2010 to March 2011. The study was approved by Babol University of Medical Sciences Ethics Committee.

From all women that had indication for CNB informed consent for FNAB was obtained. Both CNB and FNAB were done by two guided methods, sonography or streotaxy.

Sonography guided biopsy performed for all patients with palpable or visible mass on sonography and stereotaxy guided biopsy was done for sonography invisible mass. Sonography and srereotaxy equipments were G.E.logic 700 with 9-13 MHz linear transducer and simens-mammo mat_3, respectively.

Two craniocaudal views were taken to determine the location of lesion and needle. FNAB was done under local anesthesia. Enough material (4-6 slides) was obtained by fine needle (22-23 G) from lesion and margins. Half of these slides were air – dried and the others were carnoy's – fixed. Then guided – CNB was performed by 14 or 16 G needle. All slides sent to pathology departments, were stained by conventional methods and examined by pathologist.

All cytology slides examined without any knowledge about biopsy results and classified as follows:

1. C_1: Unsatisfactory
2. C_2 : Benign
3. $C_{3:}$ Atypia probably benign
4. C_4: Suspicious for malignancy
5. C_5: Malignant (17).

Kappa measure of concordance was calculated and reported based on the percentage. Landis and

Koch's guidelines have been used to interprete K levels. According to these strategy K coefficient less than 0 indicating no agreement, 0-0.2 as slight, 0.21 – 4 as fair, 0.41 – 0.6 as moderate, 0.61 – 0.8 as substantial, and 0.8 -1 as almost perfect agreement (22).

Results

Thirty- six patients with 37 breast masses enrolled in this study. The mean age of patients was 42.91± 10.48 years (range 17-68).

Guided FNAB results showed 7, 21, 0, 0, and 9 cases for C1, C2, C3, C4 and C5, respectively. However, 7(18.91%) cases of C1 was clinically diagnosed as cyst (5 cases) and lipoma (2 cases) placing the report in benign (C2) category. Therefore, the results were separated into 2 groups, benign (C1, C2 and C3) and malignant (C4 and C5). The CNB results are as followss: 9 fibrocystic changes, 7 without malignancy, 6 fibroadenoma, 2 epithelial hyperplasia, 1 reactive change, 1 fat necrosis, 1 acute mastitis, and 10 malignancies. The data presented in Table 1 shows the number of all lesions in both guided-CNB and guided – FNAB at each category with respect to that only 1 case in benign category of FNAB was diagnosed as malignancy in guided-CNB.

Table 1- The number of the concordance of breast lesions in FNAB and CNB with guided of sonography and/ or stereotaxy between 2010 – 2011

Guided- FNAB / Guided-CNB	C2	C3	C4	C5	Total
Malignancy	1	0	0	9	10
Fibrocystic change	9	0	0	0	9
Without malignancy	7	0	0	0	7
Fibroadenoma	6	0	0	0	6
Epithelial hyperplasia	2	0	0	0	2
Reactive changes	1	0	0	0	1
Fat necrosis	1	0	0	0	1
Acute mastitis	1	0	0	0	1
Total	28	0	0	9	37

Twenty- seven and 10 patients were categorized into benign and malignant groups, respectively (Table 2). The kappa coefficient was calculated 0.93 with standard deviation of 0.07. Thus, we have 93% concordance between these two methods.

Table 2- Concordance of breast lesions in FNAB and CNB with guided of sonography and/ or stereotaxy between 2010 – 2011

Pathological Results		Guided- FNAB		Total
		Benign	malignant	
Guided- CNB	**Benign**	27	0	27
	Malignant	1	9	10
Total		28	9	37

Discussion

The present study was conducted on 37 breast masses to evaluate the concordance rate between FNAB and CNB with respect to this point that both FNAB and CNB was done on each breast mass simultaneously. FNAB is rapid, inexpensive, less invasive method with least side effects. However, it has own limitations like insufficient results, unable to diagnose invasion and false negative results. Ultrasound guidance and good aspiration technique in experienced hands has been shown to improve the sensitivity, specificity and accuracy of FNAB, thus it has been determined to be an accurate method in diagnosis of palpable breast mass (10-14,16).

On the other hand, CNB has higher sensitivity as well as lower inadequate results than FNAB. But this procedure is risky, less cost- effective and more invasive than FNAB (10, 11, 17, 18).

In our study the concordance rate between these two methods was 93%, which is different in various studies.

Garg *et al*. reported concordance rate between FNAC and US-CNB for tumor grading was 59.1% but this was 94.44% between CNB and excisional biopsy. They concluded that sensitivity, specificity and tumor grading of CNB are superior to FNAC. However, FNAC as a simple and cost-effective method that providing immediate definitive diagnosis in some cases must be considered as complementary method to CNB. They recommended FNAC as an initial method in some patients (19). We studied this subject for benign and malignant lesions with the result of 93% for both of them. Higher concordance rate in our study may be due to performing FNAC with the guidance of sonography or stereotaxy. In agreement with Garg *et al*. we also recommended guided- FNAC at first in breast mass evaluation. Guided- CNB must be reserved for inadequate or atypical results.

Chuo *et al*. studied 330 breast masses undergoing FNAC and CNB, with or without sonography guidance. Sixty – eight lesions had C5 report in FNA whereas, B5 (malignancy) was 87 in CNB. Although all C5 FNAC findings accurately diagnosed the presence of malignancy, they found that CNB diagnosed more cases of malignancy than FNA in their study. Using ultrasound guidance has been shown to improve the accuracy, sensitivity and specificity of FNAC. However, they recommended FNAC should be done as it complimented CNB findings and also was useful on lesions inaccessible to CNB (23). In our study, all of the 9 cases of C5 in FNA had the same result (malignancy) in CNB, pointing to 93% concordance.

A study from Northern Nigeria showed that FNAB was a highly accurate method for palpable breast lesions and mentioned that if diagnostic accuracy was high in a centre, because of high experience, therapeutic schedule could be begin and excisional diagnostic method was reserved only at the patient's request. In line with our study they recommended that FNAB is a first line diagnostic technique in patients with palpable breast mass especially in developing countries (13).

Chiu *et al*. showed that in experienced hands, accuracy of ultrasound guided-FNA was improved, therefore CNB could be reserved for lesions with C1 or abnormal results by FNA (14).

Hatada *et al*. reported specificity of US –CNB was higher than US –FNAB, but with the use of both techniques, sensitivity, specificity and accuracy were all 100% (15).

Meunier *et al*. studied FNAC vs. CNB in nonpalpable breast lesions and reported that masses were best biopsied under US or stereotactic guidance. They pointed that although FNA was a very cost effective and time saving procedure, insufficient sampling and the impossibility to diagnose invasion were still the main limits. On one hand, CNB was time consuming and more expensive. However, these two nonsurgical

biopsy procedures were most useful in the setting of good correlation between radiologist and pathologist and appropriate management. Their recommendation for reducing inadequate results was to have a pathologist who instantly stain and examine the smears, additional aspiration must be done if necessary (16).

In our study inadequate result of FNAB (C1) was 18.9%. This rate varies in different studies.

Chiu *et al*. showed a 19% inadequate result that was similar to our study (14).

Lieske *et al*. reported that CNB missed fewer breast malignancies in comparison with FNAB and also showed 8% C1 vs. 5% B1. However, he strongly recommended that performing combined FNAB and CNB leads to the improvement of diagnostic accuracy (17). Lieu studied 500 consecutive masses underwent UG – FNA and / or UG – CNB. He concluded that UG – FNA performing on all breast masses at first step. If the cytopathologic evaluation leads to inadequate, indeterminate, atypical, or malignant results, UG – CNB must be done. Therefore, triaging for UG-CNB might be possible (18).

Conclusion

It seems that high concordance and low inadequate sample rate were due to good correlation between radiologist and pathologist and were strongly enough to recommend using guided-FNAB at first step of breast mass evaluation, while guided-CNB may reserved for inadequate or abnormal results. Also the specialists must be aware of the limitations of these two diagnostic methods.

Acknowledgment

The authors declare that there is no conflict of interest.

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