

นิพนธ์ต้นฉบับ

Original Article

## Fine Needle Aspiration of the Breast in Nakhonpathom Hospital

### การใช้เข็มขนาดเล็กเจาะดูดก้อนเต้านม ในโรงพยาบาลนครปฐม

จริยา ไวศยารัตน์ พ.บ.,

ว.ว. พยาธิวิทยา

กลุ่มงานพยาธิวิทยากายวิภาค

โรงพยาบาลนครปฐม

Jariya Waisayarat M.D.,

*Thai Board of Pathology*

*Department of Anatomical Pathology,*

*Nakhonpathom Hospital*

#### ABSTRACT

**Objective :** To evaluate the efficiency of breast FNA by correlation between cytologic and histologic diagnoses.

**Materials and methods :** The author reviewed the records of patients who had undergone breast fine needle aspiration and subsequent histopathologic diagnoses during January 2006 to December 2008 at the Department of Anatomical Pathology, Nakhonpathom hospital. Sensitivity, specificity, positive and negative predictive values were calculated with the assumption that the “suspicious” group was classified as positivity for malignancy and cases with an unsatisfactory diagnosis were not included in further analysis.

**Results :** There were 55 matching cases. Eliminating unsatisfactory results, statistical analysis of the remaining 46 cases yielded the following results : sensitivity 85%, specificity 96.1%, positive predictive value 94.4% and negative predictive value 89.2%.

**Conclusion :** The results compared favorably with those in the literature. An understanding of the performance and limitation of FNA can enhance its value as diagnostic in the management of breast disease.

**Keywords :** fine needle aspiration : FNA, breast mass, diagnosis

#### บทคัดย่อ

**วัตถุประสงค์ :** เพื่อประเมินความแม่นยำของการวินิจฉัยผลเซลล์วิทยาของก้อนเต้านมที่ได้จากการเจาะดูดด้วยเข็มขนาดเล็ก

**วัตถุประสงค์และวิธีการ :** โดยการรวบรวมผลการวินิจฉัยเซลล์วิทยาของก้อนเต้านมที่ได้จากการเจาะดูดด้วยเข็มขนาดเล็ก ในผู้ป่วยรายเดียวกัน และคำนวณค่าความไว ความจำเพาะ และความแม่นยำของการทำนายค่าผลบวกและผลลบ

**ผลการศึกษา :** เมื่อเปรียบเทียบผลการวินิจฉัยเซลล์วิทยากับผลการตรวจชิ้นเนื้อแล้ว พบว่าผลการวินิจฉัยเซลล์วิทยามีความไวร้อยละ 85 ความจำเพาะร้อยละ 96.1 ความแม่นยำของการทำนายค่าบวกและผลลบร้อยละ 94.4 และ 89.2 ตามลำดับ ผลลบลงร้อยละ 6.5 และบวกลงร้อยละ 2.1

**สรุป :** การวินิจฉัยเซลล์วิทยาของก้อนเต้านมที่ได้จากการเจาะดูดด้วยเข็มขนาดเล็กของโรงพยาบาลนครปฐม มีความแม่นยำใกล้เคียงกับรายงานอื่น

## Introduction

Fine needle aspiration (FNA) cytology is well established as diagnostic procedure for detecting benign and malignant breast lesions.<sup>1-3</sup> This technique has a number of advantages over the open biopsy. It is minimally invasive since very thin gauge needles are typically used. Thus fine needle aspiration is well tolerated by patient and side effects are usually limited.<sup>4</sup> It is also a fast, cost-effective and reliable method.<sup>1,3,5-6</sup> However, FNA alone is subject to inaccuracy and does not definitively diagnose all breast lesions. It is most commonly used in combination with clinical examination and mammography in the so-called "triple test". When all components of the triple test are in agreement, the diagnosis is over 99% reliability, according to several studies.<sup>1,3,5,7</sup>

The aim of the retrospective study was to evaluate the efficiency of breast FNA by correlation between cytologic and histologic diagnoses and as an internal quality assurance exercise for cytologic diagnosis in the Department of Anatomical Pathology, Nakhonpathom hospital.

## Materials and methods

A retrospective review of the records of patients

who had undergone breast fine needle aspiration and subsequent histopathologic diagnoses during January 2006 to December 2008, were included. Histopathologic confirmation consisted of either incisional biopsy, excisional biopsy or mastectomy specimen. All FNAs were performed by clinicians and were submitted to the Department of Anatomical pathology, Nakhonpathom hospital for interpretation. Samples were usually smeared onto glass slides. They were immediately fixed in 95% alcohol and stained by Papanicolaou method. The number of smears submitted varied from two to eight smears per patient ; the average number was about four smears per patient. All the smears were interpreted by either one or two pathologists at Nakhonpathom hospital. The FNA reports were classified in four groups ; unsatisfactory, benign/negative, suspicious and malignant. Unsatisfactory aspirates were those not representative in regarding to sampling, cellularity, quality or smear and/or the staining. Benign smears usually contained only normal-appearing cells. Suspicious smears were those in which the cells had morphologic features of malignancy but there was an inadequate number of cells to evaluate and also if the cell were atypical but with insufficient cytologic

abnormalities to allow a final diagnosis. Malignant smears were those containing abnormal cells-an unequivocal feature of malignancy.

Corresponding cases of FNA and histology were compared and slides of the cases of major discrepancy including unsatisfactory smears were reviewed. Sensitivity, specificity, positive and negative predictive values were calculated with the assumption that the "suspicious" group was classified as positivity for malignancy and cases with diagnosis of unsatisfactory were not included in further analysis.

## Results

During the study period, 155 breast FNAs were reported. There were 55 matching cases. Ten specimens were classified as positive, twenty-eight as negative, nine as unsatisfactory and eight as suspicious. The cytohistological correlation of the 55 cases is shown in table I. All positive cytologic diagnoses were confirmed to be carcinoma on biopsy. Of the 28 masses diagnosed on FNA as negative, 25 were confirmed as benign and 3 as malignant on excisional biopsy. Seven of the 8 suspicious specimens taken at FNA proved to be malignant.

Eliminating unsatisfactory results and assuming the suspicious and positive cytologic findings represented carcinoma of the breast, FNA detected cancer with a sensitivity of 85%, specificity of 96.1% positive predictive value of 94.4% and negative value of 89.2%. table II showed aggregated results.

## Discussion

The value of any diagnostic method usually lies in its ability to detect the presence of disease

when it is present (sensitivity) and verify the absence of disease when it is not present (specificity). The high rates of sensitivity and specificity indicate the high reliability of the test. FNA of the breast in the literature showed a wide range of sensitivity from 65% to 100%, with a specificity of 32% to 100%. The positive and negative values ranged from 68% to 100% and 70% to 100%, respectively.<sup>2,5,8-13</sup> The results of the present study allow a reliable evaluation of the accuracy of FNA in the diagnosis of breast masses. The accuracy rate of FNA improves when the well-trained pathologist performs the FNA and makes immediate feed back about the specimen adequacy.<sup>1,9</sup>

The overall rate of unsatisfactory specimens in this study was 16.3%. The incidence of unsatisfactory aspirates in the literature ranged from 0% - 57.2%.<sup>4,6,10</sup> The poor quality of unsatisfactory aspirates mainly results from acellularity or not being representative of an aspirated lesion. The lack of cellular material is explained in most case by histological properties of the tumor i.e. fibrosis, hemorrhagic necrosis, vascularity, cell type and tumor size.<sup>3,6,9,10</sup> Other contributing factors are failure in the technique of FNA (number of needle passes and aspirator's experience), missing the tumor by puncture at more advanced stages and improper specimen preparation.<sup>8,9</sup>

Sufficient sampling of the breast lesion is essential to provide satisfactory cell yield in order to avoid false negative or unsatisfactory aspirates. Definitions of adequacy are variable. Scopa, et al defined a minimum of 10 clusters composed of at least 10 epithelial cells on more than one slide and

the background should be non-inflammatory and/or non-necrotic as satisfactory specimen. Sneige, et al reported that unsatisfactory specimen were "those containing less than four to six well-visualized cell groups and/or specimen distorted or obscured by blood".<sup>3,9,14</sup>

The acceptable rate for inadequate specimen is < 25%. In this study, the rate of unsatisfactory specimen was 16.3%. The subsequent histologic diagnosis revealed seven invasive ductal carcinomas, one medullary carcinoma and one medullary carcinoma and one fibrocystic disease. The review of FNA of all these cases demonstrated acellularity in 8 cases and scanty cellularity in 1 case.

The false negative rate varied considerably in the published documents, from 1% - 35%.<sup>1,2,5,6</sup> The major causes of false negative discussed in the literature were lack of experience in either aspiration or interpretation of smears, small tumor size, deep location, well-differentiated carcinomas, fibrosis and associated with fluid or benign specimen.<sup>4,6,14</sup> Malignant tumor adjacent to a fibroadenoma, desmoplasia and severe edema are some factors that contributed to false negative report.<sup>10</sup>

In this report, 6.5% (3/46) or cases were diagnosed as false negative. They were as follow : one case was reported as fibroadenoma and the two cases were negative. Review of the 2 negative cases revealed a few small clusters of degenerated atypical cells against a background of lysed blood. The abnormal cells had a high nuclear to cytoplasmic ratio and hyperchromatic nuclei. Histologic examination showed a well-differentiated invasive ductal carcinoma in one case and intraductal carcinoma with

focal areas of invasion in another case. The false negative case that was reported as fibroadenoma showed hypercellularity, loss of cellular cohesion and hyperchromatic nuclei. Pathologist's interpretation error was contributed to this false negative case. Apart from aspiration, sampling and interpretative errors, tumor-size, paucicellularity, special histologic types such as tumor showing extensive fibrosis in those with cell having bland cytologic features like lobular carcinoma can also contribute to an increase the false negative rate.<sup>1,14</sup> Awareness of these potential pitfalls can be helpful in avoiding a false negative report in the future.

True false positive diagnoses are rare in breast fine needle aspiration and are mainly due to interpretative errors.<sup>1,5,6</sup> The error may be either misinterpretation of clearly benign cell as malignant or misinterpretation of cytologic abnormalities induced by a benign process as reflecting cancer.<sup>4</sup> False positive rate in the previous documents ranges from 0.3% to 5.8%.<sup>2,5,6,11,13</sup> Proliferative fibrocystic disease and fibroadenomas with atypical are the most common causes of false positive diagnoses.<sup>1,5,6</sup> In this study, there was 2.1% (1/46) false positive rate. This case was histologically diagnosed as fibrocystic disease. Review of the cytologic smears revealed hypercellularity with cohesive ductal epithelial groupings. Neither significant nuclear atypia nor pleomorphism of the ductal cell population was observed.

According to some inevitable limitations of breast fine needle aspiration, this procedure should not be used as the sole criterion for evaluating of breast masses.<sup>9,10</sup> The best avoidable practice with subsequent inappropriate clinical decision is the usage

of the so called triple diagnostic procedure of clinical examination, mammography and FNA cytology which increase the accuracy for the diagnosis of breast cancer. The triple test has been shown to be highly sensitive and specific in the diagnosis of breast.<sup>1,3,5,7,14</sup>

In conclusion, this study described the experience with FNA breast diagnosis in a general hospital in a three-year period. The results compared favorably with those in the literature. An understanding of the performance and limitations of FNA can point to ways of enhancing skills in sampling and interpretation of FNA specimens and contribute to a more widely used diagnostic method.

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### References

1. Ergete W. Fine-needle aspiration of palpable breast lesions with histopathologic correlation. *Ethiop J Health Dev* 1999 ; 13 : 181-6.
2. Wachirapunt A, Chaovalit S, Rujivanichkul S. Accuracy of FNA cytology of palpable breast mass in Mahraj Nakhon Sri Thammarat Hospital. *Songkla Med J* 2000 ; 18 : 2537-7.
3. Logrono R, Kurtycz DF, Inhorn SL. Criteria for reporting fine needle aspiration on palpable and nonpalpable masses of the breast. *Acta Cytol* 1997 ; 41 : 623-7.
4. Koss LG, Woyke S, Olszewski W. Aspiration biopsy-cytologic interpretation and histologic bases. Tokyo : Igaku-Shoin 1984.
5. Soontrapornchai P, Sriplung H, Tanisaro K, Charoonratana V. Accuracy of diagnostic tests in the evaluation of solid breast mass in Songklanagarind Hospital. *Songkla Med J* 2000 ; 18 : 129-34.
6. Dominguez F, Riera JR, Tojo S, Junco P. Fine needle aspiration of breast masses. An analysis of 1,398 patients in a community hospital. *Acta Cytol* 1997 ; 41 : 341-7.
7. Vetto J, Pommier R, Schmidt W, Wachtel M, DuBois P, Jones M, et al. Use of the "triple test" for palpable breast lesions yields high diagnostic accuracy and cost savings. *Am J Surg* 1995 ; 169 : 519-22.
8. Feichter GE, Haberthur F, Gobat S, Dalquen P. Breast cytology : statistical analysis and cytologic correlation. *Acta Cytol* 1997 ; 41 : 327-32.
9. Kim A, Lee J, Choi JS, Won NH, Koo BH. Fine needle aspiration cytology of the breast : Experience at an outpatient breast clinic. *Acta Cytol* 2000 ; 44 : 361-7.
10. Collaco LM, de Lima RS, Werner B, Torres LF. Value of fine needle aspiration in the diagnosis of breast lesions. *Acta Cytol* 1999 ; 43 : 587-92.
11. Ariga R, Bloom K, Reddy VB, Kluskens L, Francescatti D, Dowlat K, et al. Fine-needle aspiration of clinically suspicious palpable breast masses with histopathologic correlation. *Am J Surg* 2002 ; 184 : 410-3.
12. Mansoor I, Jamal AA. Role of fine needle aspiration in diagnosing breast lesions (Abstract). *Saudi*

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- Med J 2002 ; 23 : 915-20.
13. Chaiwun B, Settakorn J, Ya-in C, Wisedmongkol W, Rangdaeng S, Thorner P Effectiveness of fine-needle aspiration cytology of breast : analsis of 2,375 cases from northem Thailand. Diagn Cyto-  
pathol 2002 ; 26 : 201-5.
14. Yeoh GPS, Chan KW. Fine needle aspiration of breast masses : an analysis of 1,533 cases in private practice. HKMJ 1998 ; 13 : 181-6.