

DIAGNOSTIC RELIABILITY OF COMBINED APPROACH OF PHYSICAL EXAMINATION, MAMMOGRAPHY AND FINE-NEEDLE ASPIRATION BIOPSY IN PATIENTS WITH BREAST CANCER

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Breast cancer is a common malignancy in females. For that reason, the disease has to be suspected when one encounters a solid mass in the breast. Until recently, in order to find out the actual nature of the lump, both excisional biopsy and histopathologic examination were thought to be essential. Nowadays, fine-needle aspiration biopsy (FNAB) is performed to evaluate the solid mass in the breast, and by using this technique, individual characteristics of each cell can lead to diagnosis. But it is reported that erroneous diagnosis is more common with FNAB than with excisional biopsy and histopathologic examination. Despite the recent advances in diagnostic techniques, physical examination is still the first step in breast cancer diagnosis, and it is the most widely used method. Mammography and FNAB should follow. However, the accuracy rate of mammography alone is especially low for the evaluation of small masses. Therefore, FNAB has become of use as an important adjunctive diagnostic procedure, and it is used along with physical and mammographic examinations. Some authors report that the rate of correct diagnosis rises, sometimes up to 100%, when these three methods are applied together.

The aim of the present study is to detect the diagnostic reliability of a combined approach with physical examination, mammography and FNAB in patients with breast cancer.

Materials and Methods

In this study, we performed preoperative physical examination, mammography and FNAB in 385 patients who had a palpable mass in the breast carrying possible malignancy. All of these patients were admitted to our surgical department from 1990 to 1994, and after preoperative examination, they were operated upon and their tumors histopathologically proven.

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Accepted for publication 29 December 1998. Received 29 August 1998.

Analysis

Physical examinations performed by specialist surgeons were grouped as malignant, suspicious malignant or benign. The size of the tumors were 40.9 mm, 34.8 mm and 27.1 mm, respectively. Mammography results were classified according to the following criteria: 1) malignant: irregular borders, occasional spicular-dominating density, with or without microcalcifications or secondary signs such as skin thickening, skin retraction or increased vascularity; 2) suspicious malignant: multitude of angular microcalcifications with no dominant density, poorly demarcated mass or density, with regular borders in postmenopausal breast; 3) benign: rounded density with regular borders, occasionally with surrounding halo.¹

After mammography, FNAB was performed by a specialist surgeon. A 20- or 21-gauge needle and a 10 mL plastic syringe were used for this procedure. Material obtained in the syringe was spread on two or more glass slides, fixed in 95% ethyl alcohol and sent to the laboratory for rapid staining with hematoxylin and eosin. Then the aspirate was cytologically examined. At the same time, the pathologist was informed of the conclusions derived from the physical examination and the mammographic findings. The results of the fine-needle aspiration were elucidated in five groups¹ as: 1) acellular (unsatisfactory): material contains too few cells to evaluate; 2) benign: material contains benign cells, as in fibroadenoma or fibrocystic disease (Figure 1); 3) non-diagnostic: material contains cells that do not carry diagnostic properties; 4) malignant: material contains cells with obvious malignancy (Figure 2); and 5) suspicious:

TABLE 1. Overall results of physical, mammographic examinations and FNABs in 385 patients with breast carcinoma.

	PE (%)	MG (%)	FNAB (%)
Malignant	358 (92.90)	337 (87.50)	310 (80.50)
Suspicious	10 (2.59)	30 (7.79)	46 (11.95)
Benign (false-negative)	17 (4.42)	18 (4.68)	7 (1.82)
Non-diagnostic	–	–	5 (1.29)
Acellular	–	–	17 (4.42)
Total	385	385	385

PE=physical examination; MG=mammography.

TABLE 2. The distribution of cases with malignant, suspicious and benign (false-negative) FNABs.

	FNAB (%)	MG (%)	PE (%)
Malignant	310 (85.40)	337 (87.50)	358 (92.9)
Suspicious	46 (12.67)	30 (7.79)	10 (2.59)
Benign (false-negative)	7 (1.93)	18 (4.68)	17 (4.42)
Total	363	385	385

FNAB-MG-PE= $P<0.001$; FNAB-MG= $P<0.05$; FNAB-PE= $P<0.001$ (chi-square test).

TABLE 3. Diagnostic variations in all cases.

Patients (%)	PE	MG	FNAB
274 (71.17)	+	+	+
7 (1.82)	-	+	+
2 (0.52)	Suspicious	+	+
7 (1.82)	+	-	+
3 (0.78)	-	-	+
15 (3.89)	+	Suspicious	+
1 (0.26)	Suspicious	Suspicious	+
1 (0.26)	-	Suspicious	+
25 (6.49)	+	+	Suspicious
4 (1.04)	Suspicious	+	Suspicious
9 (2.34)	+	Suspicious	Suspicious
1 (0.26)	Suspicious	Suspicious	Suspicious
1 (0.26)	-	Suspicious	Suspicious
3 (0.78)	-	+	Suspicious
3 (0.78)	+	-	Suspicious
6 (1.56)	+	+	-
1 (0.26)	Suspicious	Suspicious	-
11 (2.86)	+	+	Acellular
2 (0.52)	+	-	Acellular
2 (0.52)	-	-	Acellular
1 (0.26)	Suspicious	-	Acellular
1 (0.26)	+	Suspicious	Acellular
5 (1.29)	+	+	ND
385 (100)			

PE=physical examination; MG=mammography; ND=non-diagnostic; +=malignant; -=benign.

material contains atypical cells which are suspicious but cannot be diagnosed as carcinoma.³ All 385 patients who had not previously had an operation for breast lesions were operated on after the triple test was done.

In the present study, we compared the results of physical examination, mammography and FNAB of 385 patients and tried to assess the accuracy rate of a combination of these three methods. Chi-square and Fisher's exact tests were used for statistical analysis.

Results

A positive diagnosis of malignancy was made on 310 aspirates (80.52%). A further 46 aspirates (11.95%) were

reported as suspicious. At preoperative physical examination, 358 patients (92.99%) were interpreted as malignant, compared to 337 patients (87.53%) who were judged to be malignant by mammography. The rate of suspicious malignant cases by mammography and physical examination was 7.79% and 2.59%, respectively (Table 1).

Positive diagnosis of FNAB was 85.4% after excluding non-diagnostic and acellular cases (Table 2). False-negative rates of physical examination, mammography and FNAB had been interpreted as 4.42%, 4.68% and 1.93%, respectively. In terms of false-negativity rate, FNAB was superior to mammography and physical examination ($P<0.001$). The interpretation rates of malignant and susceptible lesions of FNAB and mammography were found as 98.1% and 95.3%, respectively. This rate was 95.6% on physical examination ($P<0.05$). However, FNAB was superior to mammography ($P<0.05$).

The malignancy rate found by using the triple test was 71.2%. If the suspicious cases of FNAB were included, the rate of diagnostic accuracy reached 77.7% (Table 3). The sensitivity of FNAB, mammography and physical examination were 97%, 95% and 95.5%, respectively.

Discussion

The diagnostic accuracy rate of breast aspiration cytology varies among different centers. The accuracy of breast FNAB is dependent on the skill and experience of the personnel who perform the aspiration, prepare the slides and interpret the results. However, most studies indicate that with experience, the frequency of false-negative and false-positive results can be minimized.^{4,5} One of the main standpoints is the false-positivity rate. The false-positivity rate of FNAB has been reported as decreasing, and in some reports it is nearly zero.^{3,5,6} However, the rate of false-positive diagnosis was over 10% in some recent series.⁷ Some authors emphasize the importance of supplementing mammography with FNAB. On the other hand, the claim of the necessity of physical examination to obtain maximum diagnostic accuracy and to minimize false-positive results is obvious.^{1,2}

In this study, the results of physical examination, mammography and FNAB of 385 patients with histopathologically proven breast carcinomas were evaluated. Malignancy or suspicious rates of physical examination, mammography and FNAB were found as 95.6%, 95.3% and 98.1%, respectively. FNAB seemed to be superior to mammography and physical examination, but this was not significant. However, FNAB gave better results than mammography ($P<0.05$). If acellular and non-diagnostic cases of FNAB were included (Table 1), diagnostic accuracy rate decreased (92.47%). This shows that interpretation methods can influence diagnostic accuracy rates. It has been reported that the accuracy rate of FNAB is 66%-95%.^{3,5,8} The reason for the better results with respect to mammography can be explained by the

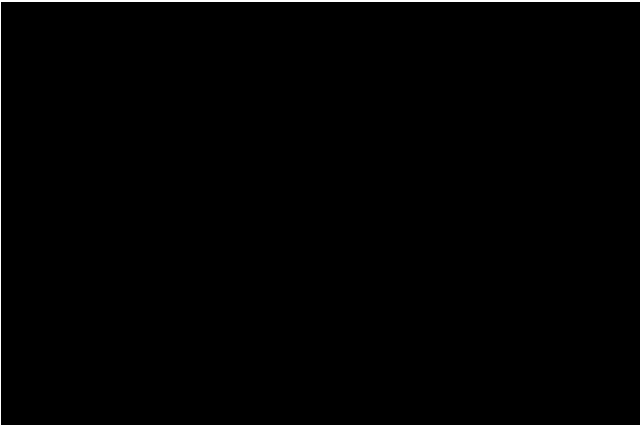


FIGURE 1. Fine-needle aspiration containing benign cells (H&E, 100x).

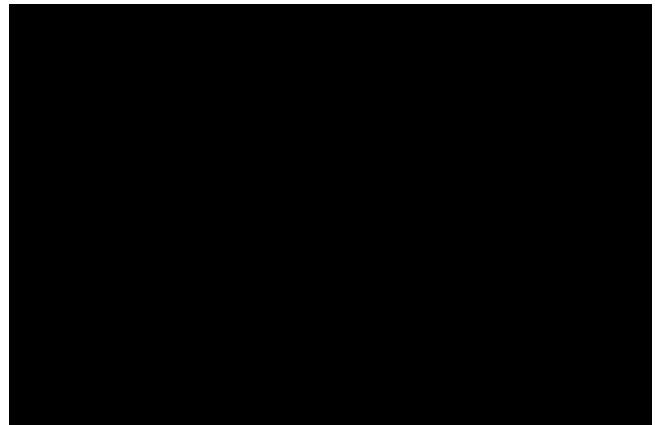


FIGURE 2. Malignant FNAB, malign cell aggregate exhibiting pleomorphism and loss of cohesion (H&E, 400x).

qualified experience of the examining surgeons who usually work on breast and the relatively larger-sized tumors which are palpable (approximately 3.7 cm).

The rate of acellular cases at FNAB was 4.42%, with a rate of non-diagnostic cases of 1.29% and a rate of false-negative cases of 1.82% (Table 1). By excluding acellular and non-diagnostic cases, the false-negative rate is 1.93% (Table 2). The false-negative rate was 10% and lower in breast FNAB,^{8,9} and in some series this rate was about 2%.⁶ These results demonstrate that the false-negative rates are lower than the results declared in the literature. In addition to this, FNAB was superior to the other techniques in terms of false-negativity ($P<0.01$) (Table 2).

The diagnostic accuracy rate was 71.17% for each three diagnostic methods used in malignant cases (Table 3). There were 6.49% of cases having a diagnosis of suspicious on FNAB, but of malignancy on physical examination and mammography. Therefore, by using the triple test, the diagnostic accuracy rate became higher (77.66%). We can accept this value as reasonable. For suspicious cases of FNAB, fine-needle puncture can be repeated, and for every repeated case, diagnostic accuracy of FNAB rises.¹⁰ As a result, FNAB has the lowest false-negative rate. From our own results, a case having a diagnosis of benign or suspicious by using only one of these three methods could in fact be malignant. This means that each of these three methods alone has a false-negative rate. But the opposite should also be considered, namely, that a malignant case diagnosed by using one of these three methods might not actually be a tumor. However, when triple test is performed, false-negative and

false-positive rates become zero. Therefore, in order to enhance preoperative diagnostic accuracy, the combination of physical examination, mammography and FNAB should be performed, and a lesion interpreted as malignant by these three methods should be assessed as a true malignancy. However, FNAB should be repeated if the lesion is interpreted as susceptible by FNAB, even if it is malignant by mammography and physical examination.

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