

Fine-Needle Cytology of the Breast:

A Controlled Study of Aspiration Versus Nonaspiration

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We report on 534 breast masses examined by fine-needle aspiration cytology. Two samples were obtained from each mass, one with aspiration and the other without. Aspiration, equivalent to that obtained by a 20-ml syringe on full aspiration, was obtained by an automatic aspirator. The two sampling modalities did not differ apart from aspiration and were compared in terms of inadequate sampling rates. The inadequacy rate was the same in 166 cancers (6.6%), whereas a significant difference was recorded in favor of aspiration (13.6 versus 24.4%) in 368 benign masses. When inadequate results were excluded, the accuracy of the two modalities was almost the same. Sensitivity was 97.4% and 96.7% and specificity was 99.4% and 99.3% for sampling with and without aspiration, respectively. Reducing the rate of inadequate sampling from benign masses seems to be the major advantage of aspiration. Double sampling, independent of the specific techniques, reduced inadequacy rates to very low levels (1.2% for cancers; 5.9% for benign masses) and may be useful as a routine policy. Diagn Cytopathol 1991;7:125-127.

Key Words: Breast cancer; Breast cancer diagnosis; Fine-needle aspiration cytology

Fine-needle cytology has been extensively employed in breast cancer diagnosis in the past two decades.¹⁻³ The standard technique involves the aspiration of cells by applying to the needle a negative pressure created by a syringe, either by hand or by a specific holder.⁴ Recently, an alternative technique has been proposed that involves the use of the needle alone, without aspiration, with cells being conducted into the needle by capillary force.^{5,6} According to some reports,^{5,6} the results of this technique are comparable with those of classic needle aspiration, trauma

and hemorrhagic sampling contamination are reduced, and the direct contact with the needle allows more sensitive evaluation of tumor consistency. Unfortunately, no controlled study is available comparing nonaspiration and the conventional aspiration technique.

We assessed the impact of aspiration on sampling adequacy, and the two sampling modalities, i.e., a needle without aspiration or a needle connected to an automatic aspirator, were thus compared.

Materials and Methods

The study involved a consecutive series of palpable breast masses of clinical concern observed at the Centro per lo Studio e la Prevenzione Oncologica of Florence and at the Centro per lo Studio e la Cura del Carcinoma della Mammella of the V. Buzzi Hospital of Milan from October 1988 to February 1989.

Two samplings were obtained for each lesion. One was obtained by needle alone according to the technique described by Zajdela et al.⁵ The other sampling was performed by a needle connected to an automatic aspirator,⁷ which exerted a negative pressure of 50 ml Hg, equivalent to that obtained with a 20-ml syringe on full aspiration. The needle was connected to the aspirator by means of a thin flexible plastic tube, and aspiration was controlled by pedal. The movements of the needle and the feeling of tumor consistency were absolutely identical with the two techniques, which did not differ in anything but the use of aspiration. Samplings were performed in the same session by the same operator using 21-22-gauge needles. Two experienced operators (S.C. and S.C.) performed all the samplings in the study, one at each institution.

Further processing of smears was identical, and smear reading by the cytopathologist done without knowledge of which technique had been used. The cytologic report was coded as *inadequate* (absence of cells), *negative* (normal

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cells or adipocytes), *dubious* (atypias not consistent with cancer though sufficient to advise surgical biopsy), and *positive* (atypias consistent with cancer). The type of breast lesion was assessed on an histologic basis or on clinical, mammographic, and echographic evidence in benign cases in which no biopsy was advised.

The inadequacy rate of the two compared sampling modalities was separately determined for benign and for malignant lesions. After exclusion of inadequate samplings, cytologic accuracy was determined for the two compared techniques, dubious reports being treated as positives. Differences between the two techniques were assessed according to the chi-square test, statistical significance being set at $P < 0.05$.

Results

Overall, 534 breast masses were evaluated in the present study. Cancer was histologically confirmed in 166 cases. A benign lesion was histologically or clinically assessed in 32 or 336 cases, respectively. Results were not different at the two institutions participating in the study, and cumulative results are therefore reported.

Table I shows the distribution of cases according to lesion type, cytologic report, and sampling modality. No difference in inadequacy rate was observed according to sampling technique in cancer cases (6.6% in both groups). On the other hand, the inadequacy rate was significantly higher in benign lesions sampled without aspiration compared with those sampled with aspiration (24.4% versus 13.6%; chi square = 14.11; $P < 0.001$). The inadequacy rate was higher for fibrocystic disease (31.4% or 16.3% without or with aspiration, respectively); than for fibroadenomas (19.7% or 14.8% without or with aspiration, respectively). The excess inadequate samplings obtained without aspiration from benign lesions were mostly due to absence of material. Other features, such as retention of architectural pattern, degree of cellular degeneration and cellular trauma, and presence of obscuring material, such as blood clot or cellular debris, did not differ in the two sampling techniques. When the sampling tech-

Table I. Distribution of Cases by Lesion Type, Cytologic Report, and Sampling Modality

Lesion type	Cytologic report	Sampling modality		
		Aspiration	Nonaspiration	Both*
Cancer	Positive	144	143	153
	Dubious	7	7	7
	Negative	4	5	4
	Inadequate	11	11	2
Benign	Positive	—	—	—
	Dubious	2	2	2
	Negative	316	276	344
	Inadequate	50	90	22

*The more severe cytologic report was used.

niques were considered together, the cumulative inadequacy rates dropped to 1.2% (2 of 166) for cancer and to 5.9% (22 of 368) for benign lesions.

Cytologic accuracy did not differ significantly according to sampling modality. Sensitivity was 97.4% and 96.7% and specificity was 99.4% and 99.3% for the aspiration and nonaspiration techniques, respectively. When both sampling techniques were considered together, the sensitivity was 97.6%; dubious or positive cytology was obtained in 153 of 166 total cancers, compared with 143 without aspiration and 144 with aspiration.

Discussion

The present study allows reliable evaluation of the usefulness of aspiration in fine-needle sampling of breast masses. In fact, the presence or absence of aspiration was the only difference between the two compared modalities, which were identical from any other point of view. The lesions and the operators were the same, and cytologic interpretation was absolutely blind. Any possible confounding effect due to different operators or readers, which may affect studies comparing two consecutive periods,⁵ was thus excluded.

The negative pressure applied by free-hand aspiration may vary depending on the syringe size and the operator. To avoid this bias, an automatic aspirator was employed using a negative pressure equivalent to that obtained by a 20-ml syringe and a Franzen handle, as currently employed in aspiration cytology.

Observed inadequacy and accuracy rates were consistent with most literature reports,⁸ confirming the good standard of both sampling and reading. In most cases, the benign lesions were assessed on a clinical and instrumental basis. The limited follow-up cannot exclude the possibility of false-negative cases, which might surface as clinical cancers in the future, but this lack should not affect the comparability of the two sampling modalities.

The present study has shown that adding aspiration to the single-needle technique significantly reduces inadequate samplings from benign lesions. This is a relevant advantage considering that inadequate results are reported as a major problem in the cytologic evaluation of benign masses.⁸ The aspiration technique described in the present study maintains all the advantages of single-needle sampling, such as high needling precision and a better feeling of tumor consistency, and may represent an improvement in fine-needle cytology of breast masses. This study also has confirmed that most inadequate results are ruled out by double sampling, which might thus be suggested as a standard policy.

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