Success of Stereotactic Fine-Needle Aspiration Cytology Depending on Quality of Sampling

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Many investigations have documented the value of breast fine-needle aspiration cytology (FNAC) in the treatment of patients with palpable and impalpable breast lesions (Barrows et al. 1986; Wilkinson et al. 1989; Giard and Hermans 1992; Willis and Ramzy 1995; Anonymous 1996; Feichter et al. 1997; Park and Ham 1997; Klijianenko et al. 1998; Börner et al. 1999; Leifland et al. 2000).

The Swedish Cameco syringe has long been used in many European countries and also in other continents (Fig. 1). Ultrasound guidance supports the success of the puncture, which may for instance take the form of confirming a diagnosis of breast cancer. This syringe is also often used in other fields, e.g. in the diagnosis of head and neck tumors.

A collection of fine needles that can be used with the Cameco-system is shown in Fig. 2.

With regard to general immunohistochemical developments, it is also possible to evaluate special biological features such as overexpression of c-erb B2 (p185) and DNA ploidy (Dey et al. 2000; Wu et al. 2000).

However, especially in large clinics with high medical staff turnover, long-term training and experience in handling the SFNAC techniques are in decline. The same applies when the cytopathology team has frequent changes in the medical staff and also in the laboratory staff. Therefore, results obtained by a single clinic with the same cytopathologists throughout are presented.

Certainly most investigators agree that to avoid missing a malignant lesion absolute and complete sensitivity must be high and the false-negative rate must be low. When results from the literature are calculated in the same way as in this series (Zakhour and Wells 1999a), absolute and complete sensitivity lie in the ranges of 50.3–82.6% and 76.9–98.0%, respectively, and the false-negative rate is between 2.6% and 12.1%. Our data show an absolute sensitivity of 63.3%, a complete sensitivity of 83.3%, and a false-negative rate of 6.7%, representing two aspirates.

Table 1 summarizes the cytologic results from all 355 aspirations. Solid breast lesions were considered malignant, benign, suspicious or inadequate in 8.7%, 66.9%, 5.8%, and 18.6% of cases, respectively, whereas cystic lesions were considered malignant, benign, suspicious, or inadequate in 0.9%, 96.5%, 0.9%, and 1.8%, respectively.

In 7 of the 22 aspirates containing malignant cells a ductal tumor subtype was recognized, and in 3, a mucinous subtype. There were 2 false-negative results, 1 from a solid and 1 from a cystic lesion. The cystic lesion was not palpable, and the clinical and imaging findings, including MR mam-

![Fig. 1. The Cameco system used in fine-needle aspiration cytology (FNAC). The syringe is a one-way type, which can easily be removed from the frame. The system has a light metal frame. It is light and practical in use.](image)
mography, had not raised suspicion. The cytological diagnosis was “fibrocystic change.” Biopsy and histological examination were performed 8 months after fine-needle aspiration and cytological analysis. A diagnosis of a ductal carcinoma in situ (DCIS) with minimal stromal invasion was made. Reexamination of the smears showed a very few suspect cells, which had been underdiagnosed as apocrine cells with marked degeneration in the first evaluation.

The solid lesion had been palpable, but neither the clinical nor the imaging findings were suspicious. The initial cytology-based diagnosis was “fibrocystic change, fibroadenoma possible.” Histology showed an invasive ductal carcinoma (pT1c N0). Fibrocystic change was found close to the carcinoma.

The results of all cases based on FNAC were compared and checked against those of the subsequent histopathological examinations. The results of the comparison are summarized in Table 2.

In cases with a benign cytological diagnosis the rate of malignant events in the following 2.5 years was very low (Table 3).

Successive evaluations in the same collective of patients have shown that FNAC alone does not give optimal results; rather it must be combined with radioimaging systems and ultrasound methods (Table 4).

The highest rates of cancer detection were obtained when clinical appearance, ultrasound, and FNAC were used for diagnosis in a synergistic manner. These rates were 89.7% on average.

This is comparable to the rate achieved with the well-known so-called triple test when used in clinics as a basis for deciding whether an operation is indicated (O’Neil et al. 1997; Rocha et al. 1997; Rubenchik et al. 1997; Wang and Ducatman

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**Table 1.** Cytological findings (n =355)

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Malignant</th>
<th>Benign</th>
<th>Suspicious</th>
<th>Inadequate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>22 (6.2%)</td>
<td>271 (76.3%)</td>
<td>15 (4.2%)</td>
<td>47 (13.2%)</td>
<td>355</td>
</tr>
<tr>
<td>Solid</td>
<td>21 (8.7%)</td>
<td>162 (66.9%)</td>
<td>14 (5.8%)</td>
<td>45 (18.6%)</td>
<td>242</td>
</tr>
<tr>
<td>Cystic</td>
<td>1 (0.9%)</td>
<td>109 (96.5%)</td>
<td>1 (0.9%)</td>
<td>2 (1.8%)</td>
<td>113</td>
</tr>
</tbody>
</table>

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**Fig. 2.** Fine needles, some of which can be used for breast puncture and some also for organ punctures (the longer needles are adequate for lung and liver punctures.