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CORE NEEDLE ASPIRATION BIOPSY OF PALPABLE BREAST MASSES

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The purpose of the present study was to determine the usefulness of core needle aspiration biopsy (CNAB) with an 18-gauge modified Menghini needle in the preoperative evaluation of 145 palpable breast masses as the major indicator for definitive treatment by surgery. Of the 145 lesions histologically verified by surgery, 126 were diagnosed as carcinoma, of which 117 were correctly diagnosed by the needle biopsy (93%). CNAB showed a sensitivity of 90% in the diagnosis of breast malignancy and a specificity of 100%. The overall diagnostic accuracy was 91%. There were no false-positive results and after definitive diagnosis with the Menghini needle, a one-stage procedure without frozen sections could be performed for definitive treatment of breast carcinoma.

It is generally accepted that, prior to a mastectomy for breast carcinoma, a definitive histological diagnosis should be established. Fine-needle aspiration cytology (FNAC) has become a generally accepted procedure for diagnosis of breast cancer and the chance of obtaining definitely malignant cytologic material in patients with breast cancer ranges from 42% to 90% (1–15). Although some reports have accepted FNAC as a major guide for definitive breast surgery (4–6, 10, 11, 16, 17), this issue remains controversial and a procedure with frozen sections is frequently used. At our institution, aspiration biopsy of the breast has been routinely performed by radiologists and, following an agreement made with surgeons and pathologists, it was decided that radiologists should carry out core needle aspiration biopsy immediately after mammography in palpable breast masses to reduce histopathology on frozen sections. We here report a series of 142 selected patients with 145 mammographically and clinically suspicious breast lesions in which an 18-gauge modified Menghini core aspirating needle was used to obtain tissue cores for histologic diagnosis and as the major guide for definitive treatment by surgery.

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Material and Methods

Between June 1991 and December 1992, 195 core needle biopsies were performed on 186 patients with presumably malignant lesions. Patients were selected as suitable for preoperative core needle aspiration biopsy (CNAB) only if a definite lump could be felt on clinical examination by the surgeon and a suspicious mass was visualized at mammography. Patients with lesions thought to be benign were excluded from this study.

In forty-four patients (28 with a CNAB result of carcinoma and 16 with a CNAB result of benign lesion), final tissue diagnosis by surgery was not obtained and they were excluded from the study. The remaining 142 patients had 145 lesions histologically verified by surgery, and 6 of these patients, with strong suspicion of breast cancer, underwent two core biopsies at different times, because the first biopsy was negative. The results from these 142 patients (mean age 58 years, with a range from 29 to 83 years) with 151 CNAB form the basis of the present report. One hundred and forty of the 151 CNAB were performed by a radiologist (AV) with a long experience from the aspiration biopsy technique and 11 CNAB by a second radiologist (EO). All core biopsy specimens and histologic specimens from surgery were studied by a single pathologist (FG).

The method of core biopsy includes betadine preparation of the skin overlying the breast mass, and intradermal injection of 1–2 ml of 1% lidocaine. The breast mass to be sampled is then fixed between the index and middle fingers of the left hand and, before the puncture, the skin is opened with a scalpel blade. Since sampling with the

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TruCut needle is limited to a single area, a disposable 18-gauge modified Menghini core-aspirating needle (Surecut, TSK Laboratory, Japan) is introduced through the subcutaneous tissue. The Surecut needle has a central stylette attached to the plunger of an integral syringe and extends along the whole length of the needle, emerging to form a pointed tip. The penetration of the needle should be stopped as soon as the needle point is close to the breast mass. The needle is kept perpendicular to the skin surface, the syringe aspirated and the syringe plunger locked automatically. Then, the needle is advanced into the breast mass, maintaining the syringe in aspiration. A characteristic gritty feeling may be encountered when the needle is placed into a malignant lesion. After three movements up and down with a different angle, the needle is completely withdrawn. The tissue core is obtained by unlocking the syringe plunger locking device and removing the biopsy specimen from the needle lumen by pushing the plunger directly into a specimen bottle with absolute alcohol. Afterwards, the puncture area is covered with sterile gauze and sustained pressure is applied for at least 5 min to minimize hematoma formation. This compression should be applied by a member of the medical staff and not by the patient herself. The biopsy procedure does not usually take more than 10 min. In our study one single core biopsy was taken from each lesion.

The majority of the biopsy cores (85%) were approximately 1 mm thick and 15 mm in length and occasioinally the specimen was smaller or fragmented. All biopsy cores were processed by the Department of Pathology immediately after the needle biopsy procedure. Each specimen was fixed in absolute alcohol, stained with one drop of eosin, wrapped in filter paper and embedded in paraffin wax in an automatic processor within a plastic cassette. Serial sections 4 μm thick, parallel to the long axis and including the maximum possible area, were cut and mounted on numbered glass slides. Hematoxylin and eosin-stained sections were evaluated to establish the histological diagnosis. Patients whose core biopsy was positive for carcinoma were proposed, without frozen sections, for definitive surgical therapy: mastectomy or lumpectomy plus the axillary node dissection. Patients whose core biopsy was reported as atypia, benign or inadequate were considered negative and were proposed for open biopsy.

Results

The results from 142 patients with 145 lesions who underwent 151 CNAB were available for comparison with the results from definitive surgical treatment or open biopsy. Two patients had a fibroadenoma and carcinoma simultaneously: one in the same breast and the other in different breasts. One patient with breast carcinoma underwent CNAB of her breast lump and, ten months after mastectomy, a further CNAB for an infraclavicular metastatic node. Samples sufficient for histologic study were obtained in 146 of the 151 core biopsies (96.7%). Of the 145 lesions with final diagnosis by surgery, there were 126 invasive carcinomas: 94 invasive ductal carcinomas (9 tumors were a mixture of invasive ductal carcinoma and invasive lobular carcinoma and were included in this group), 26 pure invasive lobular carcinoma, 2 medullary carcinomas, 2 papillary carcinomas, and 2 mucinous carcinomas. There were no cases of inflammatory carcinoma in the 126 patients.

Table 1 shows the results of a comparison of CNAB and surgery. CNAB results were positive in 117 of the 126 patients with breast cancer (93%) and definitive surgical therapy without frozen sections was carried out on the basis of these results. Of the 117 cases with a positive CNAB result, the histological study of the core biopsy confirmed the invasive component of the lesion in 105

Table 1

Comparison of histopathological results of CNAB and surgery in 142 *patients with* 145 *palpable lesions**

	Results of surgery						
Results of CNAB	Invasive cancer	Metastatic lymph node	Fibroadenoma	Fibrocystic changes	Inflammatory changes	Other	Total
Invasive cancer	105	2	0	0	0	0	107
Cancer	12	0	0	0	0	0	12
Atypia	1	0	0	0	0	0	1
Fibroadenoma	0	0	5	0	0	0	5
Fibrocystic changes	4	0	1	4	0	0	9
Inflammatory changes	0	0	0	0	3	0	3
Normal	2	0	1	0	0	0	3
Inadequate	2	1	1	0	0	1	5
Total	126	3	8	4	3	1	145

* In 6 patients with two core biopsies, only the second attempt is counted.

(90%). CNAB gave a false-negative result in 9 patients (7%), including one case with atypical cells in the sample and two cases with inadequate material in the needle biopsy. Open biopsy was carried out in the nine patients and the core biopsy did not delay surgical diagnosis.

In the 126 cases of invasive carcinoma, the maximum tumor diameter was reported: 38 tumors (30%) had a diameter between 10 and 20 mm; 76 (60%), between 21 and 50 mm; and 12 (10%) more than 50 mm. Mastectomy plus axillary node dissection was carried out in 118 patients and the 8 remaining patients underwent lumpectomy with axillary node dissection and breast irradiation. No frozen sections were carried out. Although in 12 patients with invasive cancer the CNAB result was positive, core biopsy did not show the infiltrating component of the carcinoma and definitive surgery decision was based on clinical and mammographical findings. Five patients with stage III breast carcinoma underwent chemotherapy to shrink the tumor prior to surgery.

In three patients with metastatic nodes in the axillary or infraclavicular region, the CNAB result was positive in two and inadequate in the other. No primary breast carcinoma was visualized by mammography in two of these patients and surgical excision of the lesion was carried out in the three patients.

In the 16 patients with benign lesions, CNAB showed no false-positive results and in 12 of them there was histologic agreement with the surgical results (Table 1). Open biopsy was carried out in all 16 patients due to suspicious palpation or mammographic findings.

Most of the patients were not too troubled by the biopsy procedure and there were no significant complications other than small subcutaneous hematoma formation. Continued bleeding and infection were not observed in any of the patients examined.

For the statistical analysis, patients with a CNAB result of carcinoma were considered positive, while those diagnosed as atypia or benign were considered negative. Five patients with inadequate specimens in CNAB were excluded from the analysis and 6 patients with two core biopsies at different times were counted twice (Table 2). We considered the only case with a diagnosis of atypia with proven malignancy as false-negative since it was truly indeterminate and demanded further clinical investigation before any definitive therapeutic action was taken. CNAB showed a sensitivity of 90% in the diagnosis of breast malignancy and a specificity of 100%. The overall diagnostic accuracy was 91%.

Table 2

*Diagnostic accuracy of CNAB**

Results of CNAB	True diagnosis		
	Positive	Negative	Total
Positive	119[+]	0	119
Negative	13[++]	14	27
Total	132	14	146

[+] Includes two cases with positive CNAB results in metastatic lymph nodes.
[++] Includes the first attempt in 6 patients with two core biopsies.
* Test parameters are calculated considering suspicious (atypia) as false-negative.

Discussion

Obtaining a preoperative diagnosis, immediately after mammography, in patients with breast lumps offers several advantages to the patient, the surgeon and the pathologist. The use of the Menghini needle for histological diagnosis of breast lumps seems to be uncommon. Watt-Boolsen et al. (18) have presented data using a 19-gauge Surecut needle and reported a positive rate for breast cancer of 65% in 67 patients with invasive breast carcinoma. Our results showed that there were no false-positives and that a correct histological diagnosis of malignancy was made in 93% of the patients subsequently shown to have breast cancer. Therefore, the decision to proceed to definitive surgical therapy can be safely based on a positive result. The one-stage procedure with frozen sections had previously been routine at our institution. In the present series definitive surgical therapy without frozen sections was carried out in 93% of the patients with breast carcinoma on the basis of a positive CNAB result. This policy is welcomed by the pathologist, who is able to make an unstressed assessment of a fully processed paraffin section. However, the operator must be experienced in the needle aspiration biopsy technique and the needle placement must be accurate to achieve optimal results and reduce false-negatives.

The results with the use of TruCut needle are conflicting. While some authors (19–22) have defended its use, others (23, 24) have shown that FNAC is superior to TruCut biopsy. Although the reported positive diagnosis rate for carcinoma ranges between 64% and 100% (19–24), the TruCut biopsy has not gained popularity as a alternative diagnostic procedure for guiding definitive surgical therapy. The conflicting results and the possible morbidity caused by the use of large-gauge needles may be the reasons why a one-stage surgical procedure with frozen sections is still fairly frequent. Khana et al. (25) reported a 100% positive rate for carcinoma with the TruCut needle in 86 breast cancers, but this rate was achieved after excluding 17.4% biopsies with inadequate material. If the biopsies with inadequate material (3.3%) were excluded, our positive rate for carcinoma was 94%.

Benign or inadequate breast tissue was obtained in 9 patients with carcinoma, one patient with a metastatic

axillary node and in the first CNAB of the 6 patients with breast cancer in whom two core biopsies were performed. These must be regarded as technically inadequate biopsies, and presumably the needle was not correctly inserted into the tumor. A negative result of core biopsy in a suspicious palpable breast mass may of course indicate surgical biopsy for unequivocal confirmation. Some clinicians are reluctant to use aspiration biopsy for the diagnosis of breast lumps due to the possibility of local implantations of malignant cells along the needle track and/or the increased risk of distant metastases following needle puncture of the tumor (26–28). Berg & Robbins (29), in an analysis of the possible danger of aspiration biopsy, came to the conclusion that this fear is unfounded. Moreover, the use of large needles (14-gauge), with multiple passes, is now advocated for mammographic-guided needle biopsy of nonpalpable breast lesions, showing histologic agreement with the surgical pathologic findings in 96% of the patients (30).

As a result of the present study we have decided to adopt CNAB as a routine procedure in the preoperative management of patients with clinical and mammographic suspicion of breast carcinoma and the use of frozen sections has been, in our institution, virtually eliminated.

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