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Needle Localization for Nonpalpable Breast Cancers

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Abstract: Nonpalpable breast lesions are being detected with the advent of improved mammographic techniques. Although only 20-30 % of these lesions are malignant, definitive diagnosis has usually required a needle-localization breast biopsy during a 6 year period were reviewed to determine the effect of this procedure on the diagnosis and treatment of early breast cancer. Calcifications were the most common mammographic abnormality for biopsy. Of the 62(27%) patients diagnosed with malignancy, 38 (61%) had invasive carcinoma and 24 (39%) had

noninvasive carcinoma. Breast conservation was the most common form (53%) of surgical treatment in this study. Metastatic disease involving the axillary lymph nodes was found in 23% of our patients who underwent axillary dissection. We conclude that needle localized breast biopsy continues to be a reliable method of detecting early breast carcinoma. Given the minimal morbidity, this procedure could be done in all patients with mammographically suspicious nonpalpable breast lesions.

Introduction

Worldwide, breast cancer is the leading cause of cancer death in women. It is estimated that by the year 2000, one million women a year will receive a diagnosis of breast cancer. When breast cancer is diagnosed before it becomes palpable, its mortality can be reduced, even for women in their 40s (1, 2). The frequent use of screening mamography in women has resulted in a large number of biopsies being performed for nonpalpable breast lesions. The lesion is by definition clinically not apparent, and surgical excision is further complicated by the plastic nature of the breast. Blind segmentectomy or quadrantectomy were the initial techniques used for obtaining tissue diagnosis of radiographic lesions, but high rates of re-excision for persistent lesions were reported. Attempts at external referencing with an applied grid or radiographically placed skin marker failed to improve the results of surgical biopsy and were time-consuming. Needle localization breast biopsy (NLBB) has significantly increased the first excision recovery rate of breast biopsy for nonpalpable lesions.

To remove lesions using NLBB requires that the surgeon follow a needle placed mammographically either into or in close proximity to the area of suspicion. Needle localization biopsy of nonpalpable masses or microcalcifications leads to the diagnosis of malignancy in 9% to 38% of biopsies (1-7).

The appearance of the lesion on mammography is the most important factor deciding whether a biopsy should be performed. Another factor for nonpalpable breast lesions is the age of the patient. The rate of carcinoma after needle localization breast biopsy is 37% in women 50 years of age or older and 17% in women less than 50 years of age. Personal or family history of breast cancer and whether the lesion had changed during observation are other factors for breast biopsy with needle localization (3).

It is the purpose of this paper to evaluate a series of nonpalpable breast cancers diagnosed at Department of General Surgery, Ege University School of Medicine, from 1989 to 1995.

Materials and methods

During a 6-year period, 230 patients underwent biopsy after needle localization of nonpalpable breast lesions at Ege University Medical School. Data analyzed included the histologic diagnosis, patient age, personal or family history of breast cancer, type of surgical procedure performed, and axillary lymph node status. The patients ranged in age from 30 to 72 years, with a mean age of 48 years. None of the lesions were palpable preoperatively. The predominant mammographic finding leading to biopsy described as a

mass or asymmetric density, suspicious calcifications, or both.

Fine needle aspiration biopsy and stereotactic core needle biopsy were not used to evaluate these nonpalpable lesions during the period studied.

Needle localization was performed using a hook-wire technique (Homer Mammalok needles) in the radiology department. The patient was then taken to the operating suite. All biopsies were performed using an open technique under general anesthesia. Confirmation of successful biopsy was obtained by immediate specimen mammography while the patient was still in the operating room. When specimen x-ray indicated that the lesion was not within the specimen, we did not perform an immediate reexcision of additional breast tissue. This approach can lead to unnecessary tissue loss with resultant breast deformity. Patients with negative specimen radiographs underwent repeat needle localization biopsy approximately 2 weeks after first biopsy if the suspicious lesion was present on postbiopsy mammogram. This time interval allows for compression of the breast during mammography.

All breast specimens were examined histopathologically, and patients with breast cancer underwent additional procedure, including modified radical mastectomy, wide excision alone or wide excision and axillary lymph node dissection (level I/II). Adjuvant therapy was recommended for all patients with involved axillary lymph nodes.

Follow-up is expressed in months from initial diagnosis to date of last known contact. Student's t-test was used for statistical analysis of data. Statistical significance was defined at $P < 0.05$.

Results

A total of 230 mammographic abnormalities were excised in patients. The lesions consisted of suspicious calcifications in 120, a mass in 89, and an asymmetric density in 21 cases. Calcifications were the most common indication for biopsy. Most of the lesions (71%) were located in the upper outer quadrant of the breast, and biopsies from this region had the highest incidence of malignancy 40/62 (65%).

Malignant disease was present in 62 of 230 (27%) nonpalpable lesions. Of the 62 patients diagnosed with malignancy, 38 (61%) had invasive carcinoma and 24 (39%) had noninvasive carcinoma (ductal carcinoma in situ, n: 23; lobular carcinoma in situ, n:1). Table I

summarizes the pathologic diagnosis by types of carcinoma. In biopsy specimens that revealed malignancy, suspicious calcifications were present 38% of patients. Tumor size of the 38 invasive carcinomas detected by NLBB was less than 2 cm (mean 1.4cm) in 18 (47%), 2 to 5 cm (mean 2.7cm) in 20 (53%) patients. The large nonpalpable tumors, while rare, occurred more commonly as infiltrating lobular histology or as part of an invasive carcinoma with varying degrees of multifocal invasive components.

Benign lesion was diagnosed in 168 (73%) of the 230 NLBB specimens on pathologic examination. Table 2 summarizes the pathologic results of patients with benign breast lesion. In this series, only one patient required more than one biopsy to remove the abnormal mammary tissue, and there were no complications with this technique.

One hundred and thirty-one (57%) of the 230 NLBB were performed in patients under age 50. Malignancy was present in 25 of (19%) patients. In women over age 50, 37 (37%) of 99 NLBB performed were malignant. Only six biopsies were malignant in women less than age 40. Malignancy was significantly more likely in patients 50 years of age or older ($p < 0.01$).

Twenty-one patients (9%) had family history of breast cancer; in 12 (57%) of these patients the biopsy revealed carcinoma. Patients with personal history of breast cancer was five (2%) of 230 NLBB. In none of these patients the biopsy revealed cancer.

Breast conservation was the most common form (53%, n: 33) of surgical treatment in this study. Modified radical mastectomy was performed in 29 of the 62 patients with breast cancer. The remaining patients were treated wide excision alone (in 22 patients) or wide excision and axillary lymph node dissection (in 11 patients). We did not perform axillary dissection for patients with DCIS (for lesions less than 25 mm, with histologically clear margins and no residual calcification of follow-up mammogram) except one patient (with comedocarcinoma). Patients who are found to be non-comedo, with low nuclear grade, can probably be treated by wide local excision alone. All patients treated by wide excision received breast irradiation in the post-operative period. Patients with histologically negative axillary nodes did not receive irradiation to nodal areas.

Axillary dissections were performed for 40 of 62 patients with malignancy. Lymph node involvement

was present in only 9 (23%) of the patients who underwent axillary dissection. Lymph node metastasis was found in 2 (11%) of the 18 patients with tumors ≤ 2 cm. Adjuvant chemotherapy was recommended for all patients with involved axillary lymph nodes.

The follow-up period ranged from 6 to 84 months (median, 27 months). Local recurrence and distant metastasis were not observed during this period.

Table 1. Pathologic Results of 62 Patients With Carcinoma

Pathology	N
Invasive ductal carcinoma	33
Invasive lobular carcinoma	3
Combined invasive ductal and lobular carcinoma	2
Ductal carcinoma in-situ	23
Lobular carcinoma in-situ	1
Total	62

Table 2. Pathologic results of 168 patients with benign breast lesion.

Pathology	N
Fibrocystic change	88
Fibroadenoma	60
Fat necrosis	6
Mild epithelial hyperplasia of usual type	6
Papilloma	4
Duct ectasia	4
Total	168

Discussion

Breast cancer is one of the most common cancers diagnosed in Turkey among women. With no current method of prevention available, early detection of breast cancer by regular self and physician performed breast examination in conjunction with screening mammography is emphasized. The rate of breast cancer detection has accelerated due to the ability of mammography to identify nonpalpable breast lesions. Although only 20-30% of these lesions were malignant, definitive diagnosis has usually required a NLBB. NLBB is now a commonly performed procedure in the diagnosis of early breast cancer (8, 9).

In this study, 27% of our NLBB showed malignant disease. This is consistent with the findings of others,

who have reported positive rates of 6% to 31% with NLBB (5, 6).

Of our nonpalpable cancers, 38 (61%) were invasive, and 24 (39%) were noninvasive. These results correlate with the other large series. Schwartz et al reported 951 (31%) of 3042 biopsies as malignant, and 418 (44%) of 951 were noninvasive cancers(10). Silverstein et al found 395 cancers (22%) in biopsies performed on 1805 patients, with higher percentage of noninvasive cancers, 202 (51%) of 395 patients (11).

Large series report an overall incidence of axillary metastasis of 40% for women with breast cancer. Metastatic disease involving the axillary nodes was found in 23% of our patients who underwent axillary dissection. This, too, is comparable to others, who have reported lymph node positivity ranging from 7% to 25%. (6, 7, 12, 13). Clearly, waiting until these nonpalpable cancers would become palpable for detection would lead to higher rates of positive axillary nodes and lower survival rates (5).

The reason of mammographic lesions found in the upper outer quadrant of the breast in this and other studies is the large volume of breast tissue found in this quadrant (3, 14). This interpretation was supported by similar biopsy yield rate in the different areas of the breast (8).

The technique of NLBB differs significantly from excisional biopsy of a palpable breast mass. To prevent missed lesions in NLBB, the surgeon should follow a needle "placed mammographically either into or in close proximity" to the area of suspicion. When a mass is palpable in the breast, the surgeon can more accurately identify the extent of the lesion for complete excision (6). NLBB can be performed using an open technique under general anesthesia with less than a 2 percent chance of missed lesions similar to those associated with biopsies of palpable lesions. The rate of missed biopsy in this study was zero and only one lesion required more than one excision to remove the abnormal mammary tissue (15).

An abnormal mammogram requiring NLBB in women over age 50, there is 35% risk of malignancy. In this study, the rate of carcinoma was 37% in women over age 50. Only, 19% (12 patients) of our NLBB were malignant in women under age 50. Malignancy was significantly more likely in patients over age 50 ($p < 0.01$). Lower biopsy yield rate in young patients may also be explained by a tendency to recommend

biopsy more liberally in younger patients because early diagnosis and treatment may be even more important in this age group; cancers are usually considered to progress more rapidly in young patients who have a greater natural life expectancy. Our results correlate with the other trials (3, 5, 16).

The risk of carcinoma is increased in patients with abnormal mammogram and personal or family history of breast cancer. Several authors reported similar results in patients with personal or family history of breast cancer. Nine percent (n: 21) of our patients had family history of breast cancer, in 57% (n: 12) of these patients the biopsy revealed carcinoma. (3, 17, 18).

Most of the women (53%, n: 33) in this series were treated with breast-conserving surgery. Level I/II axillary dissections were performed in 11 of the 38 patients with invasive carcinoma. The remaining patients (n: 22) were treated with wide excision alone, because these patients had ductal carcinoma in situ. There is definitively no role for an axillary lymph node dissection in the management of DCIS. This was concluded in a study by Silverstein which showed less than 1% involvement of the axillary nodes in cases of DCIS (19). Of the 29 patients (47%) treated with modified radical mastectomy, 27 had invasive carcinoma and only 2 had noninvasive carcinoma (Both of them refused our recommendations about treatment). In this study, the incidence of modified radical mastectomy is similar to other reported series (4, 18-22). All patients treated with breast conserving surgery re-

ceived breast irradiation in the post-operative period. We endorse performing axillary lymph node dissection only in nonpalpable invasive breast cancer.

Silverstein et al reported a significantly improved disease-free survival at 7 years for patients with nonpalpable malignancies compared with those who presented with a palpable mass. Wilhelm et al noted a 98% disease-free survival at 44 months when these patients had negative axillary lymph nodes, and 67% when the nodes were found to be involved (4). There were no local recurrences and distant metastasis in this study. This, too, is consistent with the results of others, who have reported a high disease free survival rate for nonpalpable breast cancer. But, our median follow-up (27 months) is shorter than the other studies.

We conclude that NLBB is a safe and effective method of biopsying nonpalpable breast lesions. It continues to be a reliable method of detecting early breast carcinoma. This procedure should be done in all patients with mammographically suspicious nonpalpable breast lesions. In addition, we propose that all nonpalpable lesions be identified and then evaluated based on risk of malignancy.

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