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"A STUDY OF FINE NEEDLE ASPIRATION CYTOLOGY IN THE EVALUATION OF PATIENTS WITH RADIOGRAPHICALLY OCCULT PALPABLE BREAST ABNORMALITIES"

Surgery

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ABSTRACT

The patients who present with radiographically occult palpable breast abnormalities represent a diagnostic challenge. Fine needle aspiration cytology (FNAC) could be an accurate method for diagnosing and excluding malignancy in these patients.

Materials and Methods: The records of all patients undergoing FNAC at our institution between Jan 1, 2016 and to 31st december 2016 were queried. 173 patients with 175 palpable breast masses without an imaging correlate were included.

Results: Of 175 FNAC performed, 2 (1%) were malignant, 16 (9%) were suspicious, and 157 (90%) were benign (n = 75) or non-diagnostic (n = 82). All 16 suspicious FNAC had additional biopsy, of which 4 were malignant. FNAC led to the identification of 6 (3.4%) occult malignancies. At a median follow-up of 16.3 months, 1 patient within the benign cohort was found to have an incidental 2.5 mm cancer identified on reduction mammaplasty, which was unrelated to the index mass. The negative predictive value of FNAC in benign patients was 100%.

KEYWORDS

FNAC, Breast.

Introduction:

Its usually seen that a palpable breast mass is the reason for consultation to a primary care physician in 42% of patients with breast symptoms,1 and accounts for more than half of breast complaints in women presenting to breast centers.2 When a mammographic or sonographic correlate to the palpable abnormality can be identified, the decision for biopsy is based on the imaging characteristics of the lesion. In 30 to 45% of patients with a palpable lump, there are no imaging findings to explain the palpable abnormality.3,4 Evaluation of these patients ranges from close clinical follow-up with imaging and physical examination, to open surgical biopsy, which is costly and not considered "best practice" for the initial diagnosis of breast lesions.5,6. Long-term clinical and imaging follow-up may be necessary in the setting of biopsy avoidance in order to avoid a "missed cancer", with most studies reporting a minimum 2-year follow-up.3,7

Fine needle aspiration cytology (FNAC) is a minimally invasive biopsy technique that can be performed in the office under palpation guidance. Ariga et al. demonstrated excellent histopathologic correlation of FNAC with core biopsy, excisional biopsy, and surgical specimens among 1,158 women undergoing FNAC, with a sensitivity, specificity, and positive and negative predictive value of 98%, 98%, 99%, and 91%, respectively for the entire cohort.9. In patients with imaging occult palpable lesions, FNAC, with its reported high sensitivity and specificity,9,10 may be helpful in differentiating benign from malignant lesions.

Few studies have assessed the utility of FNAC for imaging occult palpable breast masses.11 The purpose of our study was to evaluate the accuracy of FNAC in diagnosing and excluding malignancy in patients with radiographically occult breast lumps.

Materials and methods:

In total, 175 FNAC were performed in 173 patients. FNAC was performed in the office by the surgeon under palpation guidance. The skin was cleansed with alcohol. Approximately 0.5 cc of 1% lidocaine was infiltrated into the skin overlying the palpable abnormality with a 25 gauge needle. Then, using a 22 gauge needle attached to a 10 cc syringe, 3 to 4 passes were made into the lesion with constant negative pressure applied to the syringe. The cellular aspirate was placed in a methanol-water preservative solution and sent for cytologic evaluation. In line with available resources, cytologic specimens were reviewed post-procedure and were not assessed in real time by pathologists to determine specimen adequacy.

Cytology findings were grouped into 4 categories: benign, non-diagnostic, suspicious, or malignant. Specimen adequacy was defined by our cytopathologists, based on the Bethesda conference on breast cytology guidelines.12,13. A malignant diagnosis was made when sufficient well-preserved malignant cells were identified.

Results:

Median age was 45 years (range, 17–82 years).

Table 1 demonstrates the initial cytology results for the 175 FNAC, stratified by: a) age, and b) clinical suspicion of the palpable finding. 90% of the cohort had a benign or non-diagnostic FNAC, with a similar incidence of benign cytology in patients < 40 (40%) versus ≥ 40 years of age (44%). Of 171 breast masses where clinical suspicion was documented, 168 (98%) were considered to be of low clinical suspicion. Only 3 masses were of moderate (n = 2) or high suspicion (n = 1), of which 2 were ultimately malignant.

In total, FNAC led to the identification of 6 (3.4%) occult malignancies. The clinical and tumor characteristics of the 6 patients with occult malignancy identified by FNAC are summarized in Table 2.

Table 3 demonstrates the pathologic findings in the 157 benign/non-diagnostic aspirates performed in 156 patients. Median follow-up in the benign/non-diagnostic cohort was 16.3 months (range, 3.6–43.4 months), with 105/156 patients (67%) having at least 12 months of follow-up.

Discussion:

Despite significant advances in breast imaging, approximately one-third of patients complaining of a palpable breast mass have no imaging correlate.4 Reasons that a palpable breast mass may not be seen by imaging include mammographically dense breasts, benign changes in the breast that produce no discernible imaging finding, or insidious tumor growth pattern making detection by standard imaging difficult. The National Comprehensive Cancer Network (NCCN) guidelines recommend that for patients with a palpable breast mass and negative imaging, the clinician can opt for clinical observation every 3–6 months for 1–2 years (when clinical suspicion is low) or perform tissue biopsy.14 FNAC and core biopsy are both appropriate options; however, FNAC requires a pathologist experienced in cytology.14 In our study, FNAC was the initial diagnostic approach for evaluating patients with radiographically occult palpable breast masses due to its technical simplicity and short procedure time; here we evaluate the accuracy of FNAC in this setting.

Of 175 FNAC, 10% had a suspicious or malignant diagnosis, of which 3.4% were confirmed malignant by additional tissue biopsy. These findings are similar to published data by Rajan et al., which demonstrated suspicious FNAC in 5 (3.5%) of the 142 patients with a palpable abnormality and no radiologic correlate. Of those, 2 patients, or 1.4% of the cohort had a malignancy on further biopsy.11 In the 2 aforementioned studies, the incidence of malignancy in patients with imaging occult breast masses is lower than the 27% incidence (of malignancy) reported following minimally invasive biopsy for

mammographically or sonographically visible breast masses.15 Despite the lower incidence of malignancy seen in patients with imaging occult breast masses, it is notable that the rate of malignancy is substantial enough to warrant investigation with FNAC, particularly in this setting where assessment of clinical suspicion is limited. Although initial diagnostic imaging was not uniform for the entire cohort, the numbers of suspicious (6%) and malignant biopsies (1%) in the subset that had both mammogram and ultrasound are slightly lower, but similar to that of the entire cohort (with less uniform imaging).

In patients with a mammographically or sonographically visible mass, a biopsy result that does not explain the imaging finding is considered discordant, and repeat biopsy or excision is usually recommended.6 However, concordance is more difficult to determine in the absence of an imaging finding, as assessment of clinical suspicion based on clinical exam alone can be challenging. The Bethesda Breast Cytology Consensus Statement reports that non-diagnostic cytology may be explained by the fact that non-proliferative breast changes such as fibrosis found in fibrocystic changes, atrophy, lipomas, and hyalinized fibroadenomas presenting as a palpable mass, yield very few or no epithelial cells, even with repeat aspiration.13 In our study, 82 (47%) of the 175 FNAC were considered non-diagnostic, which is comparable to a study by Patel et al., who reported an overall unsatisfactory aspirate rate of 41.6%.16 Similarly, Rajan et al. reported "insufficient" cytologic findings in 110 (78%) of 142 patients with a palpable breast mass and negative imaging. In their study, at 4 weeks of follow-up, only 31/142 patients had a persistent palpable abnormality for which repeat FNAC (n = 26) or core biopsy (n = 5) was performed. Of the 26 repeat FNAC, 8 were benign and 18 were insufficient. These patients were ultimately discharged back to their primary care physician.

In conclusion, FNAC detected malignancy in a small but significant percentage of patients with a palpable lump and negative breast imaging, while effectively excluding carcinoma in the remaining patients, including patients with non-diagnostic cytology. Discrimination of benign and malignant lesions based on clinical suspicion alone may be challenging. FNAC, in conjunction with clinical judgment, is an accurate diagnostic tool and can be included in the standard work-up of patients with radiographically occult palpable breast lumps.

TABLE 1: Initial cytology results for the entire cohort (n = 175) stratified by a) age and b) clinical suspicion.

A.

Cytology results	Total (n = 175)	< 40 years (n = 48)	≥ 40 years (n = 127)
Benign	75 (43%)	19 (40%)	56 (44%)
Non-diagnostic	82 (47%)	22 (46%)	60 (47%)
Suspicious	16 (9%)	6 (12%)	10 (8%)
Malignant	2 (1%)	1 (2%)	1 (1%)

B.

Cytology results	Clinical Suspicion			
	Low (n = 168)	Moderate (n = 2)	High (n = 1)	Not documented (n = 4)
Benign (n = 75)	74	0	0	1
Non-diagnostic (n = 82)	78	1	0	3
Suspicious (n = 16)	15[*]	1[*]	0	0
Malignant (n = 2)	1	0	1	0

Table 2: Clinical characteristics of patients with occult malignancy (n = 6) diagnosed by FNAC

Case no.	Age (years)	Imaging study	FNAC finding	Additional biopsy method	Histology	Tumor size (cm)	Tumor stage
20[†]	77	Mammogram	Suspicious	Core	IDC	4.2	IV
96	49	Mammogram	Suspicious	Core	ILC	1.6	IA
111[†]	51	Mammogram	Malignant	N/A[‡]	IDC	0.9	IA
119	30	US	Malignant	Core	DCIS	1.3	0
121	43	Mammogram	Suspicious	Core	IDC	3.6	IIA
134	32	Mammogram, US	Suspicious	Open	IDC	1.7	IIIC

Table 3: Cytologic findings among 157 benign/non-diagnostic aspirates

Cytologic Diagnosis	Benign (n= 75)	Non-Diagnostic (n=82)
Fibrocystic change	35 (46.7%)	3 (3.7%)[*]
Fat necrosis	6 (8%)	1 (1.2%)[†]
Fat	10 (13%)	30 (36.6%)
Fibroadenoma	1 (1.3%)	0 (0%)
Lymphoid tissue	1 (1.3%)	0 (0%)
Inflammation	0 (0%)	1 (1.2%)
No diagnosis specified	22 (29.3%)[‡]	47 (57.3%)

[*]Insufficient material for diagnosis but suggestive of fibrocystic change
[†]Insufficient material for diagnosis but suggestive of fat necrosis
[‡]Denotes benign clusters of ductal cells without a specific pathologic finding

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