Fine-needle aspiration cytology in the evaluation of patients with radiographically occult, palpable breast abnormalities

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Background. *Patients who present with occult, palpable breast abnormalities on radiographs represent a diagnostic challenge. We hypothesized that fine-needle aspiration cytology (FNAC) would be an accurate method for diagnosing and excluding malignancy in these patients.*
Methods. *The records of all patients undergoing FNAC at our institution between 2010 and 2012 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 nondiagnostic (*n = *82). All 16 suspicious FNAC underwent an 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%.*
Conclusion. *FNAC detected malignancy in a small but significant percentage of patients with a palpable mass and negative breast imaging while excluding carcinoma in the remaining patients. FNAC may be included in the evaluation of patients with occult, palpable breast masses demonstrated on radiography. (Surgery 2015;158:946-53.)*

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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 30–45% of patients with a palpable lump, there are no imaging findings to explain the palpable abnormality.[3,4] The 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]

Several studies have demonstrated that a normal mammogram and ultrasonography in the setting of a palpable breast mass has a high specificity and can reliably exclude carcinoma.[3,7,8] Dennis et al,[7] however, acknowledge that the avoidance of biopsy in this setting requires a thorough ultrasonography examination by a skilled technologist and radiologist via the use of excellent near-field transducers to effectively exclude carcinoma. Furthermore, long-term clinical and imaging follow-up may be necessary in the setting of biopsy avoidance 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[9] demonstrated excellent histopathologic correlation of FNAC with core biopsy, excisional biopsy, and operative specimens among 1,158 women undergoing FNAC, with a sensitivity,

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specificity, and positive and negative predictive value of 98%, 98%, 99%, and 91%, respectively for the entire cohort. Compared with core needle biopsy, FNAC is used less frequently in the assessment of imaging abnormalities requiring biopsy because differentiation between in situ and invasive malignancies is not possible and because immunohistochemical stains for prognostic markers may be less accurate when performed on cytology specimens. 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 occult breast lumps on radiography.

MATERIALS AND METHODS

After approval from our institutional review board, the radiology and pathology records of all patients with a palpable breast lump undergoing FNAC at our Comprehensive Breast Center between January 2010 and December 2012 were queried. A total of 569 patients were identified who underwent FNAC for a palpable breast abnormality. Of these, 396 were excluded because they had a breast lump that was visible by imaging, or because they had less than 3 months of follow-up. The remaining 173 patients had documented imaging without a focal mammographic or sonographic finding within 1 year of FNAC.

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 mL 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-mL syringe, 3–4 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 (CytoLyt Solution, Cytyc Corporation, Boxborough, MA) 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, nondiagnostic, suspicious, or malignant. Specimen adequacy was defined by our cytopathologists by the use of guidelines from the Bethesda conference on breast cytology.[12,13] An adequate benign specimen required at least 6 well-visualized cell groups. A hypocellular or sparsely cellular specimen was considered unsatisfactory or nondiagnostic. A specimen was considered suspicious if the cellular findings were suggestive but not diagnostic of malignancy; additional tissue biopsy was recommended in these cases. A malignant diagnosis was made when sufficient well-preserved malignant cells were identified.

Information regarding the treating surgeon's clinical suspicion of the palpable mass was obtained from the medical record and was available for 171 of 175 (98%) breast masses. Patients with benign and nondiagnostic aspirates were followed with clinical examination and/or imaging evaluation at the discretion of the treating surgeon. All patients with a suspicious or malignant aspirate underwent additional tissue biopsy with either core biopsy or operative biopsy (Fig 1).

RESULTS

Initial imaging and cytologic findings of the palpable mass stratified by age. Median age was 45 years (range, 17–82 years). Of 173 patients, 47 (27%) were <40 years of age, whereas 126 (73%) were ≥40 years. All 173 patients had imaging without an identifiable lesion within 12 months of FNAC, with 153 (88%) occurring within 6 months of biopsy. Most patients (85%) had imaging before FNAC, whereas 26 (15%) had imaging after FNAC (because these patients presented to the surgeon before an imaging study was performed). Table I describes the initial imaging evaluation: (1) for the entire cohort and (2) broken down by age <40 years and ≥40. Most patients had imaging with mammography (n = 158, 91%). Information regarding mammographic technique was available for 136 (86%) of the 158 mammograms performed. The majority had diagnostic mammography (n = 115, 85%), whereas 21 (15%) had screening mammography. Of 15 patients imaged with ultrasound alone, 14 (93%) were <40 years of age.

Table II demonstrates the initial cytology results for the 175 FNAC, stratified by: (1) age, and (2) clinical suspicion of the palpable finding. A total of 90% of the cohort had a benign or nondiagnostic FNAC, with a similar incidence of benign cytology in patients <40 (40%) versus ≥40 years of age (44%). Of 171 breast masses in which 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.

Malignant/suspicious cytology. Two patients (1%) had malignant FNAC and 16 (9%) had a suspicious FNAC; all 16 suspicious FNAC had