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Original contribution

Reporting the greatest linear extent of ductal carcinoma in situ on needle core biopsy☆

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Summary Ductal carcinoma in situ (DCIS) of the breast is staged as pTis regardless of size; however, extent of DCIS correlates with local recurrence rates and likelihood of close or positive margins. As a result, DCIS extent influences patient management and is an important element in the College of American Pathologists tumor summary checklist for excision specimens. There are no recommendations regarding routine reporting of DCIS extent on needle core biopsy material, and to our knowledge, no systematic studies have evaluated the impact of reporting this in biopsy material. Consecutive cases of DCIS performed or reviewed at our institution were identified by pathology report search over a 7-year period. The greatest linear extent of DCIS on core biopsy was compared with the estimated extent in the excision. Of 241 total cases, there were 157 (65%) cases in which the DCIS extent on biopsy was smaller, 13 (5%) cases in which the sizes were equal, and 70 (29%) cases in which the biopsy size was greater, including 30 (12%) with no residual tumor on excision. Mean extent was greater on excision than on core biopsy (16.0 versus 5.7 mm; $P < .0001$); however, the opposite was seen when only small tumors (≤10 mm final size) were considered (4.5 versus. 3.6 mm; $P = .0161$). There was strong linear correlation ($r = 0.9761$; $P < .0001$) between the size change (excision size minus biopsy size) and final pathologic size. For accurate tumor summary checklist completion, DCIS extent should be reported for needle biopsy material, particularly in the setting of small tumors.

1. Introduction

The incidence of ductal carcinoma in situ (DCIS) has been on the rise in recent decades and represents approximately 25% of breast cancer diagnoses in the United States [1,2]. This increase in incidence is attributed primarily to the use of screening mammography, a method proven to be more sensitive for identifying DCIS than invasive breast carcinomas. DCIS is identified in approximately 1 of 1300 screening mammograms, with even higher rates of detection in baseline screenings [3]. Although DCIS may present clinically, as a palpable mass, nipple discharge, or skin changes, mammography is typically the best means for identifying DCIS due to the fact that it most frequently is detected as calcifications seen at the time of screening.

☆ Competing interests: None.

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Unlike invasive carcinomas of the breast, local recurrence, rather than mortality, is the primary clinical concern for patients with only DCIS. A wide range of recurrence rates is reported in the literature due to variable follow-up times and the use of adjuvant radiation [4–7]. Other factors that influence recurrence rate include patient age, presentation as a palpable mass, nuclear grade of the DCIS, margin status at the time of excision in cases of breast conservation, and the extent of DCIS. Each of these is a statistically significant independent prognostic factor, some of which are used in combination to generate the University of Southern California/Van Nuys Prognostic Index, a numeric score used to help guide clinicians regarding the need for radiation with breast conservation [8]. Current National Comprehensive Cancer Network guidelines endorse the College of American Pathologists (CAP) guidelines for DCIS reporting and state that if a patient is determined to be at "low" risk for recurrence, lumpectomy without radiation can be considered, a category 2B recommendation [9]. Despite the importance of reporting specific pathologic features in DCIS, evaluation of and recording of size in DCIS cases are inconsistent. One study reported documentation of DCIS extent occurring in only 5% of pathology reports for breast excision specimens containing only noninvasive carcinoma [10]. Because of its role in clinical decision making, the size of DCIS is an important and required component of the CAP tumor summary checklist for excision specimens [11]. There are, however, no recommendations regarding the inclusion of DCIS size on needle core biopsy material.

It has been previously shown that in cases of invasive carcinoma of the breast, needle core biopsy material contains the greatest extent of carcinoma in 12% of cases [12]. This raises the possibility that original needle core biopsy may also contain a greater extent of DCIS than the subsequent excision in a significant proportion of cases. Our study was designed to review a large series of breast core needle biopsies with the subsequent excisions containing DCIS to compare the greatest linear extent of DCIS on the needle core biopsy with the estimated extent in the excision specimen.

2. Materials and methods

After obtaining institutional review board approval for the study, consecutive breast needle core biopsies performed or reviewed at Vanderbilt University Medical Center from September 2006 to August 2013 were identified by a computer search of the surgical pathology files. The search design was limited to breast biopsy reports containing the words *ductal carcinoma in situ* or *ductal carcinoma in-situ*. Cases meeting the inclusion criteria were those with DCIS for which the greatest linear extent of DCIS was specified in the core biopsy report and estimated DCIS extent was specified in the subsequent excision report. Cases without reported DCIS extent or those with >1 mm of invasion reported in the excision pathology reports were excluded. In addition, cases for which no subsequent excision specimen report was present in the file were excluded.

The greatest linear extent of DCIS on the needle core and the estimated extent of DCIS in the excision were obtained from the pathology report. DCIS size on the core biopsy was obtained by measuring the greatest span of DCIS in a single intact breast core. In most cases, DCIS size on excision specimens was based on mapping of serial, sequentially submitted tissue sections and calculated tissue slice thickness (the majority of in-house excisions). If DCIS was limited to one slide or this information was not available (the majority of referral cases), size was based on the largest single slide measurement or that reported by the referring institution. The *final pathologic size* was defined as the largest size from the core biopsy or excision specimen. Additional pathologic findings of nuclear grade of the DCIS and the presence of necrosis and/or calcifications were also obtained from the pathology reports. Clinical and radiographic findings including patient age at the time of biopsy, presenting symptoms, type and size of radiographic findings, and type of imaging modality used were obtained from review of the electronic medical record.

The Student t test was used to compare continuous variables, whereas the χ^2 test or Fisher exact test was used to compare categorical variables. A P of .05 was considered statistically significant. Statistical analysis was performed using GraphPad Prism 6 statistical program (La Jolla, CA).

3. Results

There were 241 needle core biopsy specimens performed on 235 patients meeting the search criteria. Patient age ranged from 30 to 89 (mean, 60) years. Of the 241 cases with both biopsy and excision material demonstrating DCIS, 100 core biopsies and 55 excision specimens were referral slides from outside institutions reviewed at Vanderbilt University. Most needle core biopsies (188, 78%) were performed on patients presenting with calcifications on mammogram. Additional radiological findings included 13 patients (5%) with mammographic mass lesions and 3 (1%) with architectural distortion. DCIS presented as magnetic resonance imaging (MRI) enhancement in 8 patients (3%) undergoing screening MRI for high breast cancer risk conditions such as strong family history and current contralateral breast carcinoma. Thirteen patients (5%) presented with clinical findings including 3 with nipple discharge, 9 with a palpable mass, and 1 with discharge and a palpable mass. The indication for biopsy was unknown in 16 cases (7%).

The greatest linear extent of DCIS on core biopsy ranged from 1 to17 mm (mean, 5.7 mm; median, 5 mm). In the