Clinical Science

Rates and indications for surgical breast biopsies in a community-based health system

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Abstract

BACKGROUND: High rates of surgical breast biopsies in community hospitals have been reported but may misrepresent actual practice.

METHODS: Patient-level data from 5,757 women who underwent breast biopsies in a large integrated health system were evaluated to determine biopsy types, rates, indications, and diagnoses.

RESULTS: Between 2008 and 2010, 6,047 breast biopsies were performed on 5,757 women. Surgical biopsy was the initial diagnostic procedure in 16% (n = 942) of women overall and in 6% (72 of 1,236) of women with newly diagnosed invasive breast cancer. Invasive breast cancer was diagnosed in 72 women (8%) undergoing surgical biopsy compared with 1,164 (24%) undergoing core needle biopsy (P < .001, age adjusted). Main indications for surgical biopsies included symptomatic abnormalities, technical challenges, and patient choice.

CONCLUSIONS: Surgical biopsy was the initial diagnostic procedure in 16% of women with breast abnormalities, comparable with rates at academic centers. Rates could be improved by more careful consideration of indications.

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A recent study reporting a 30% surgical breast biopsy rate in community hospitals in Florida 1–2 compared with 7% to 17% at academic centers 3,4 has raised concerns about inappropriate surgical procedures. This finding implies that community-based surgeons do not follow standard-of-care guidelines, and rates in other states could be similar.

Also, differences could be related to a lack of access to core needle biopsy, inadequate surgeon education, or personal and institutional financial incentives.1 However, the 30% rate estimate may be inaccurate,5 misrepresenting actual community practice.

Percutaneous core needle biopsy is the preferred method for evaluating a radiographic or clinical breast abnormality and offers improved morbidity, efficiency, cost, and cosmesis. Core needle biopsy minimizes adverse effects for the majority of women with benign lesions.6,7 Women with malignant lesions also benefit, with fewer trips to the operating room and improved margin status.8–10 A statement from the International Breast Cancer Consensus Conference in 2009 strongly endorsed core needle biopsy as the best initial tissue acquisition procedure for image-detected breast abnormalities.11 An
optimal rate of core needle biopsy has not yet been standardized for the diagnostic workup of a breast imaging abnormality, but in general, experts cite a 90% target.4,12 Benchmarks have also not been established for diagnostic workups of symptomatic breast lesions.

The purpose of this study was to determine the rate of surgical breast biopsy as the initial diagnostic procedure for a breast abnormality in a large, diverse, community-based health system. A rate substantially lower than 30% and similar to reported rates at academic centers2,3,4,13 was hypothesized. An additional goal of this study was to identify documented indications for surgical biopsies to estimate an acceptable rate in practice.

Methods

This study was a retrospective analysis of data from 5,757 women undergoing either percutaneous core needle biopsy or surgical biopsy as the initial diagnostic procedure for a breast abnormality in a large health system between January 2008 and December 2010. The study was approved by the Providence Health and Services Institutional Review Board (#11-047B) and Privacy Board.

Providence Health and Services Oregon is a not-for-profit, community-based, open-access health system providing health care services across the state of Oregon. The health system includes 2 major tertiary hospitals, both with comprehensive accredited breast centers, and 5 smaller regional hospitals. The largest tertiary hospital participates in general surgery graduate medical education. Surgical biopsies are performed by 71 private practice or health system–employed surgeons with clinical privileges to perform breast procedures at Providence hospitals. Twelve general surgeons, all in private practice, serve as clinical faculty members for the general surgery residency program at Oregon Health & Science University. Six radiology centers at Providence are accredited by the American College of Radiology for core needle biopsy procedures performed by radiologists.

Data were obtained from the Providence Regional Breast Health Registry, a comprehensive database that integrates clinical data from multiple sources within the health system, including the radiology, pathology, and administrative systems using procedure codes specific to breast health encounters. The initial biopsy procedure for women was selected on the basis of Current Procedural Terminology codes 19100, 19101, 19102, 19103, 19120, and 19125. Although some women had multiple biopsies, only the initial biopsy was included in this analysis. Also, women with documented prior biopsies at outside facilities for the same indication or who underwent lumpectomies instead of surgical biopsies (code 19125) were excluded.

The database includes the following variables for each encounter: age, gender, race, type of insurance, facility, procedural charges, date and type of imaging, date and type of biopsy, type of surgeon, indication for surgical biopsy, and pathologic diagnosis. The indications for surgical biopsies were identified and categorized by manually reviewing medical and radiology reports. The primary outcome measures were rates of surgical and core needle biopsies and indications for surgical biopsies.

Comparisons between the 2 types of biopsies were performed using t tests or Wilcoxon’s rank-sum tests on continuous variables and chi-square or Fisher’s exact tests on categorical variables. The relationships of the biopsy type to the pathologic diagnostic outcome and referring physician were assessed using logistic regression controlling for age. The association between surgical biopsy indication and patient age was examined using 1-way analysis of variance. Age is reported as mean ± SE. Statistical analysis was performed using R version 2.14.0 software (R Foundation for Statistical Computing, Vienna, Austria).

Results

Biopsy rates

During the 3-year study period, 6,047 breast biopsies were performed on 5,757 women at the 7 community-based hospitals (Table 1). Surgical biopsy was the initial diagnostic procedure in 942 women (16%) with breast abnormalities and percutaneous core needle biopsy in 4,815 (84%). The surgical biopsy rate was lowest at the largest hospital, with a comprehensive cancer center and several university-affiliated surgeons on staff, compared with the other hospitals without these characteristics (13% vs 19%, P < .001, age adjusted). Referral to core needle biopsy was more likely among university-affiliated surgeons than among nonaffiliated surgeons (odds ratio, 1.86; 95% confidence interval, 1.49–2.32). The rate of surgical biopsy among women with newly diagnosed breast cancer was 6% (72 of 1,236) throughout all of the facilities.

Diagnoses and comparisons

Women undergoing surgical biopsies were approximately 6 years younger than those undergoing core needle biopsies (49.3 ± 5 vs 55.2 ± 2 years, P < .001; Table 1). Although racial differences between women undergoing the different types of biopsies were statistically significant, the majority were white, and racial status was unknown for many.

Sixty-four percent of core needle biopsies were performed stereotactically, and 36% were image guided. For patients undergoing surgical biopsies, 56% were palpation guided and 36% needle localized. Invasive breast cancer was diagnosed in 72 women (8%) undergoing surgical biopsy and 1,164 (24%) undergoing initial core needle biopsy (P < .001, age adjusted). Overall, the majority of invasive breast cancer cases were diagnosed by core needle biopsy (94%). Rates of diagnosis of ductal carcinoma in situ, lobular carcinoma in situ, and atypical breast lesions were similar for both biopsy types. A
A benign pathologic outcome was more likely with surgical than core needle biopsy (80% vs 62%, \( P < .001 \), age adjusted).

Insurance coverage differed between biopsy types, although the majority of women were covered by commercial insurance in both groups. More women undergoing core needle biopsies had Medicare coverage, while more undergoing surgical biopsies had Medicaid, likely reflecting age differences between groups. Median charges for surgical biopsy were significantly higher than for core needle biopsy ($6,172 vs $3,763, \( P < .001 \)).

**Indications for surgical biopsy**

The most common indication for surgical biopsy was the presence of a symptomatic abnormality for 55% of surgically biopsied women. The 521 symptomatic lesions included 38% palpable abnormalities with or without pain; 28% nipple discharge; 15% enlarging masses (determined clinically or by imaging); 7% cysts; 5% mastitis, fistulas, or other; 4% pain; and 3% abscess. Of the 201 lesions that were palpable, 39% were diagnosed as fibroadenomas and 11% as intraductal papillomas. Of the 144 patients presenting with either clear or bloody nipple discharge, 42% had intraductal papillomas.

Core needle biopsy was technically challenging in 287 women (30%) undergoing surgical biopsy. Documented reasons included 35% with poor locations of the abnormalities (superficial or close to the chest wall, implant, or nipple); 15% with physical limitations such as body habitus, use of anticoagulants, or exceeding the weight limit of the stereotactic table; 14% with nonvisualization; 13% with diffuse or regional calcifications; and 13% with superficial lesions. Of the 72 women diagnosed with invasive breast cancer by surgical biopsy, 30 (42%) had technically challenging lesions. Records indicated that 100 women (11%) were offered core needle biopsy but chose surgical biopsy. For 34 women (4%), the indication for surgical biopsy was not documented by either the radiologist or the surgeon.

Indications for surgical biopsy differed significantly by age (Fig. 1). Women who presented with symptomatic lesions were younger, while women with technically challenging lesions were older (43.9 ± 9 vs 54.3 ± 1.2 years, \( P < .001 \)).

**Comments**

The rate of surgical biopsy as the initial diagnostic procedure for a breast abnormality in this community-based...
health system was 16% overall and 6% for women with newly diagnosed invasive breast cancer specifically. Although the rate for surgical biopsies was lowest at the largest hospital, which included a comprehensive cancer center and several university-affiliated surgeons, rates among all the hospitals were comparable with the 17% reported for academic centers. Most of the rates previously reported in the surgical literature were based on newly diagnosed breast cancer cases, not on the diagnostic workup of all breast abnormalities (Table 2). Differences between our findings and the higher rates for community hospitals reported in other studies may be due, in part, to our use of patient-level clinical data rather than nonvalidated claims data. The Florida study, for example, was based on review of administrative data from the Florida Agency for Health Care Administration’s statewide outpatient surgery and procedure database. Our database allowed us to identify and exclude patients who underwent initial core needle biopsies at outside institutions and ensured appropriate use of biopsy surgical codes, avoiding the inadvertent use of a lumpectomy code for a biopsy, for example.

Existing studies of biopsy rates do not describe the indications for surgical biopsies but imply that many are performed inappropriately. In the Providence data, indications were recorded in the medical record for 96% of women, and they differed by age. Symptomatic lesions were more common in younger women, and technically challenging lesions were more common in older women. Also, the rate of core needle biopsy was significantly higher among university-affiliated surgeons compared with general surgeons, as other studies have suggested. However, other related factors, such as the variability of rates among individual surgeons and the roles of radiologists and other clinicians, were not evaluated. Education efforts focusing on surgeons with high surgical biopsy rates could potentially improve overall rates.

Of women undergoing surgical biopsies in this study, 85% had either symptomatic or technically challenging lesions. A minority of women chose surgical biopsies despite being offered core needle biopsies (11%), and indications for surgical biopsies were not documented in 4%. Assuming that these cases could actually be accomplished by core needle biopsy, the overall rate of surgical biopsy could improve from 16% to 14%. In addition, some of the symptomatic and technically challenging lesions might actually be successfully managed by core needle biopsy or clinical follow-up without intervention, further reducing surgical biopsy rates to the optimal level of ≤10%. Quality improvement efforts among surgeons and radiologists, improved documentation, patient education, and ongoing surveillance of rates could target this goal.

The strengths of this study include its focus on a large, diverse community-based health system of multiple hospitals; our use of validated comprehensive patient data; the inclusion of women presenting with both symptomatic and image-detected abnormalities for both benign and malignant disease; and the collection of information on documented indications for surgical biopsies. The registry is designed to track individual women as they progress through their diagnostic evaluations, and it ensures that Current Procedural Terminology codes are appropriately assigned, improving the accuracy of the data.

![Figure 1](image)

**Figure 1** Indications for surgical biopsy differed by age ($P < .001$).

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ACOSOG = American College of Surgeons Oncology Group; NCDB = National Cancer Data Base; NQMBC = National Quality Measures for Breast Centers.
We did not consider additional health system, patient, or physician factors that influence decisions about selecting core needle or surgical biopsies. For example, younger patients were more likely to undergo surgical biopsies for symptomatic relief or because of patient choice. However, the data to evaluate the decision-making processes behind these outcomes were not available for this retrospective study.

Our 16% surgical biopsy rate for breast abnormalities in a community-based health system is much lower than the rates reported in other community-based practices and is consistent with those reported by academic centers. Recent media attention on the overutilization of surgical biopsy by community surgeons and the superior performance of academic and breast specialized surgeons may be unwarranted. There are legitimate indications for surgical biopsies, and rates should reflect appropriate use. Potential areas for improvement are in more careful consideration of indications for biopsies and patient and physician education about appropriate choices.

References