

Clinical Science

The evaluation of national time trends, quality of care, and factors affecting the use of minimally invasive breast biopsy and open biopsy for diagnosis of breast lesions



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Abstract

BACKGROUND: Minimally invasive breast biopsy is a recommended biopsy method for suspicious lesions. This study examines national trends and factors associated with the use of open breast biopsy (OBB).

METHODS: The national inpatient sample database was used to examine trends and factors associated with the use of OBB. Factors associated with OBB were evaluated using chi-square test for univariate analysis and logistic regression for multivariate analysis.

RESULTS: OBB rate was 34%. Patients below 50 years of age had OBB rates of 47%, while those above 50 had OBB rates of 29.1% ($P < .001$). Higher OBB rates were observed in Asian (39.8%) and Hispanic (40.6%) women compared with white women (34.1%, $P < .001$). Private insurance patients were more likely to have OBB compared with Medicaid/Medicare patients (40.9% vs 30.6%, $P < .001$). About 1.2% of women who underwent OBB required multiple biopsies for diagnosis compared with .5% for minimally invasive breast biopsy ($P < .001$).

CONCLUSIONS: OBB is still performed in one third of women despite higher morbidity and less accuracy. Factors associated with higher OBB rate included younger age; Asian ethnicity; private insurance; small, rural, and nonteaching hospitals.

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The workup of any suspicious breast lesion usually includes a biopsy to obtain histologic diagnosis. Historically, histologic diagnosis was obtained by performing

open biopsy. The open biopsy often requires either general anesthesia or monitored anesthesia care and is usually performed in the operating room. In addition, although

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complications are not very common, it can be associated with complications such as infection or bleeding. In recent years, a less invasive technique, performed with local anesthesia in the office or radiology suite, has become available. Minimally invasive breast biopsy (MIBB) techniques include either ultrasound-directed biopsy or stereotactic core needle biopsy. The benefits of MIBB can include lower cost, less scarring and recovery time, lower potential for complications, decreased time between diagnosis and definitive treatment, fewer positive margins, and facilitation of preoperative multidisciplinary treatment planning.¹⁻⁵

Complications such as hemorrhage can occur with MIBB, but this is very rare.

MIBB also eliminates the need for surgery for many benign lesions when there is concordance among clinical history, physical examination, imaging, and needle biopsy. Studies have also demonstrated that MIBB is associated with fewer operations and reoperations and has equivalent diagnostic accuracy as open biopsy.⁶⁻⁸ Multiple professional organizations, including the American College of Radiology and the American Society of Breast Surgeons, recommend the use of MIBB as part of initial evaluation for suspicious breast lesions when possible.^{9,10} MIBB rates are being used as a quality measure of breast cancer care provided by health care professionals and institutions (<http://www.napbc-breast.org/standards/standards.html>, accessed April 24, 2013). A quality measure for breast cancer management set by the National Accreditation Program for Breast Centers (NAPBC) states that MIBB should be the initial biopsy method for evaluating suspicious breast lesions (<http://www.napbc-breast.org/standards/standards.html>, accessed April 24, 2013). In addition, annual reporting of rates of compliance is required for continued breast center accreditation by the NAPBC. In the near future, accreditation of a facility by the NAPBC may affect reimbursement for these procedures. Furthermore, as accountable care organizations are developed nationally, institutions most efficient at eliminating costs not related to quality will be the most successful.

There are few situations where MIBB may not be used including patient preference, an unfavorable position of the lesion in the breast (eg, near an implant). These situations are uncommon but can account for up to 10% of cases.¹¹ Despite these benefits of MIBB, studies from single institutions and individual state registries have shown that open breast biopsy (OBB) rates are as high as 30%.²⁻⁴ In this study, we examined, using an inpatient database, the national rates of utilization of MIBB and open biopsy and the socioeconomic, hospital, and geographic factors associated with the use of open biopsy.

Methods

This was a retrospective study utilizing the Healthcare Cost and Utilization Project National Inpatient Sample (HCUP NIS) database from 2008 to 2010. The HCUP NIS database is a set of healthcare databases maintained by the

Agency for Healthcare Research and Quality. HCUP includes the largest collection of longitudinal hospital care data in the United States, with all-payer, encounter-level information. HCUP NIS is an inpatient database which is used to examine the frequency of a procedure that is primarily performed in an outpatient basis. We searched the HCUP NIS database for all women who had a breast biopsy using the following International Classification of Diseases, 9th Revision (ICD-9) codes: closed percutaneous needle biopsy of the breast (85.11) and open biopsy of the breast (85.12). Women with breast cancer were identified using ICD-9 code 174. Complications of the procedures were identified using the following ICD-9 codes: hematoma (998.12), bleeding/hemorrhage (998.11), contusion (922.0), control of hemorrhage (3880 and 3998), and drainage of hematoma (8604). Ten-year prevalence data of MIBB and OBB were obtained from the free, on-line query system—HCUPnet—that is also based on the HCUP data.

Two hundred twenty cases in our study had both MIBB and OBB during the same hospital stay. For the purpose of comparison between MIBB and OBB, we excluded these cases (<1% of the study population) from analysis. About 15% of the race data were missing from the NIS database because some states did not provide race information. This is one of the limitations of our study. The missing data were a result of statewide omission and these states did not submit any race data (as opposed to submitting partial race data). Information regarding the characteristics of hospitals for 488 patients were not included in the analysis because these were not submitted/included in the NIS database.

Data from 46 states, including Hawaii and Alaska, were included in this database. The regions are defined as follows:

- Northeast includes ME, NH, VT, MA, RI, CT, NY, NJ, and PA.
- Midwest includes OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, and KS.
- South includes DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, and TX.
- West includes MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, and HI.

The definition of hospital size varies by the location and teaching status of the hospital. The details of the definition can be found in the HCUP Website (http://www.hcup-us.ahrq.gov/db/vars/h_bedsz/nisnote.jsp). The terms used for patient locations are the same as the county classifications that are based on the Office of Management and Budget metropolitan/micropolitan assignments criteria.

Patient characteristics examined included age at diagnosis, race, insurance payer status, and median income. From the HCUP NIS database, we were also able to obtain information on the geographic region, urban or rural residence, teaching status of hospital, ownership of hospital, bed size of hospital, and location and region of hospital where the breast biopsies were performed.

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