Changing Surgical Trends in Young Patients with Early Stage Breast Cancer, 2003 to 2010: A Report from the National Cancer Data Base

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BACKGROUND: Young patients with breast cancer represent a unique cohort of patients who often have different treatment plans than older patients. We hypothesized that the rates of contralateral prophylactic mastectomy (CPM) were significantly higher and those of lumpectomy were significantly lower in young patients compared with older patients and that this trend persists when adjusting for patient, tumor, and facility factors.

STUDY DESIGN: We used the National Cancer Data Base (NCDB) to study 553,593 patients from all ages with American Joint Committee on Cancer (AJCC) stage 0 to II breast tumors, who underwent lumpectomy, unilateral mastectomy, or CPM from 2003 to 2010.

RESULTS: Over the entire cohort, lumpectomy rates decreased from 67.7% in 2003 to 66.4% in 2010 in contrast to women 45 years old or less, in whom the lumpectomy rates went from 61.3% in 2003 to 49.4% in 2010. Unilateral mastectomy went from 28.2% to 23.9% and CPM from 4.1% to 9.7% compared with women 45 years old or less, in whom unilateral mastectomy rates went from 29.3% to 26.4% and CPM rates from 9.3% to 26.4%. Age was the most significant factor related to increasing CPM rates: 19.7% of women between 41 and 45 years old underwent CPM vs 5.1% of women between 66 and 70 years old. There was substantial regional variation in surgical procedures for young women: lumpectomy rates were lowest in the West and CPM rates were highest in the Midwest. Multivariate logistic regression showed that women 45 years old or younger compared with women more than 45 years who underwent CPM were more likely to be Caucasian, treated at an academic/research institution, have larger tumors, higher grade, higher stage, and lobular histology.

CONCLUSIONS: The rate of CPM continues to increase, with one-quarter of younger women undergoing CPM. This trend persists across all patient, tumor, and facility characteristics. (J Am Coll Surg 2014;219:19–30. © 2014 by the American College of Surgeons)

Rates of contralateral prophylactic mastectomy (CPM) in the United States have increased by approximately 150% since 1988.[1-4] Although prophylactic mastectomy is an established option for women with a genetic predisposition or otherwise significantly elevated breast cancer risk, the role of CPM in the management of the newly diagnosed patient with breast cancer remains controversial.[5] Despite the lack of evidence for a survival benefit from CPM and the relatively low risk of contralateral breast cancer in women with unilateral early stage breast cancer, an increasing number of women continue to pursue this option.

Increased CPM rates have been shown to be linked to young patient age,[2-7] and although CPM rates continue to increase in patients of all ages, the increase in CPM is most marked in young women. Few studies, however, have examined trends in unilateral mastectomy or lumpectomy over the past decade, particularly among younger women. Tuttle and colleagues[3] studied invasive breast cancers using Surveillance Epidemiology and End Results (SEER) and reported that 6.7% of all women less than 39 years old underwent a CPM compared with only 1.3% of women greater than 70 years old, but they did not report

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Abbreviations and Acronyms

AJCC = American Joint Committee on Cancer
CoC = Commission on Cancer
CPM = contralateral prophylactic mastectomy
NCDB = National Cancer Data Base

rates of CPM for other age groups. They reported that 56.1% of all patients underwent breast conservation in 1998; this increased to 59.7% in 2003, but these rates applied to patients of all ages in the cohort.[3] In our previous study of the National Cancer Data Base (NCDB) looking at rates of bilateral mastectomy among Commission on Cancer (CoC)-accredited cancer centers, we showed that 10.5% of women less than 40 years old underwent CPM, but we did not examine lumpectomy rates.[2]

In this study, we hypothesized that the greatest increase in CPM would be seen among young women and that overall lumpectomy rates have dropped, but especially among young women. We used the NCDB to contrast trends in surgical procedures between young and older women and to determine what patient, facility, and tumor factors correlated with these trends. In addition, our study contains data through 2010 and will represent the most contemporary data on surgical trends in young women newly diagnosed with breast cancer.

METHODS

Data source

The NCDB, a joint project of the American Cancer Society and the CoC of the American College of Surgeons, is a nationwide, facility-based, oncology data set that currently captures approximately 70% of all newly diagnosed malignant cancers in the United States annually reported from approximately 1,450 hospitals with CoC-accredited cancer programs. Data reported from these hospital-based cancer registries include patient demographics, American Joint Committee on Cancer (AJCC) staging and tumor histopathology characteristics, and use of surgical and adjuvant treatments. Area-based indicators of socioeconomic status and facility level characteristics are also available through the NCDB. Data are coded and reported according to nationally established protocols coordinated under the auspices of the North American Association of Central Cancer Registries (NAACCR). The NCDB currently contains information on approximately 26 million cancer cases diagnosed since 1985. Aspects of the NCDB data have been described elsewhere.[8,9] All data within the NCDB are compliant with the privacy requirements of the Health Insurance Portability and Accountability Act (HIPAA). Institutional review board approval was not required for this study because no patient, provider, or hospital identifiers were examined, no protected health information was reviewed, and the analysis is retrospective.

Study population

Using the NCDB, women diagnosed with breast cancer from January 1, 2003 to December 31, 2010 were identified. The study cohort was further limited to the first diagnosis of cancer, women who had received all or part of their care at the reporting hospital, and women who had AJCC stage 0 to II breast tumors. Neoadjuvant cases and patients diagnosed through an excisional biopsy were excluded. A total of 553,593 cases met the eligibility criteria for this study.

Predictor variables

Factors examined as potential predictors of surgery type were patient age, race, insurance status, comorbidity index, median household income, tumor histology, tumor grade, facility type, facility location, and population density. These can be roughly divided into patient, tumor, and hospital factors. Patient age was divided into comparison groups (45 years old vs >45 years old). Race was classified into similar categories as census population data (non-Hispanic white, black, Hispanic or Puerto Rican, Asian/Pacific Islander, Native American, and other). Insurance status was stratified as follows: uninsured, private, Medicaid, and Medicare. For comorbid disease, Dayo's modification of Charlson's comorbidity index was used.[10] Income was determined by area-based measures calculated from US Census data based on the patient's ZIP code at the time of diagnosis.[11]

Tumor size (T) and regional lymph node involvement (N) were categorized according to the AJCC 7th edition guidelines.[12] Tumor histology was defined according to the International Classification of Disease for Oncology (ICD-O) into the following categories: ductal, lobular, and mixed.[13] Tumor grade was classified as 1, 2, and 3.

Hospital factors were facility type, facility location, and population density. For this study, 3 hospital types were considered: academic/research, comprehensive community, and community. These CoC designations are based on the range of services offered by the cancer program, number of new cases seen annually, and participation in clinical research and resident training.[14] Briefly, an academic/research program participates in training residents and is actively involved in both basic and clinical research. A comprehensive community hospital sees 750 or more new cancer patients and conducts weekly cancer conferences. Community hospitals treat at least 300 cancer