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Clinical Investigation: Breast Cancer

Similar Survival With Breast Conservation Therapy or Mastectomy in the Management of Young Women With Early-Stage Breast Cancer

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Summary

We evaluated survival outcomes of 14,764 young women (ages 20−39 years old) with early-stage (T1−2 N0−1 M0) breast cancer treated with breast conservation therapy or mastectomy, using the Surveillance, Epidemiology, and End Results (SEER) database. Both multivariable and matched pair analyses demonstrated no differences in OS and CSS rates by type of local treatment. Patients should be counseled appropriately regarding their treatment options, and

Purpose: To evaluate survival outcomes of young women with early-stage breast cancer treated with breast conservation therapy (BCT) or mastectomy, using a large, population-based database.

Methods and Materials: Using the Surveillance, Epidemiology, and End Results (SEER) database, information was obtained for all female patients, ages 20 to 39 years old, diagnosed with T1−2 N0−1 M0 breast cancer between 1990 and 2007, who underwent either BCT (lumpectomy and radiation treatment) or mastectomy. Multivariable and matched pair analyses were performed to compare overall survival (OS) and cause-specific survival (CSS) of patients undergoing BCT and mastectomy.

Results: A total of 14,764 women were identified, of whom 45% received BCT and 55% received mastectomy. Median follow-up was 5.7 years (range, 0.5−17.9 years). After we accounted for all patient and tumor characteristics, multivariable analysis found that BCT resulted in OS (hazard ratio [HR], 0.93; 95% confidence interval [CI], 0.83−1.04; $p = 0.16$) and CSS (HR, 0.93; CI, 0.83−1.05; $p = 0.26$) similar to that of mastectomy. Matched pair analysis, including 4,644 BCT and mastectomy patients, confirmed no difference in OS or CSS: the 5-, 10-, and15-year OS rates for BCT and mastectomy were 92.5%, 83.5%, and 77.0% and 91.9%, 83.6%, and 79.1%, respectively ($p = 0.99$), and the 5-, 10-, and 15-year CSS rates for BCT and mastectomy were 93.3%, 85.5%, and 79.9% and 92.5%, 85.5%, and 81.9%, respectively ($p = 0.88$).

Conclusions: Our analysis of this population-based database suggests that young women with early-stage breast cancer have similar survival rates whether treated with BCT or mastectomy.

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These patients should be counseled appropriately regarding their treatment options and should not choose a mastectomy based on the assumption of improved survival.

Keywords: Breast cancer, Breast conservation therapy, Mastectomy, SEER database, Young women

Introduction

More than 30 years ago, a series of randomized controlled trials were initiated and ultimately established equivalent survival between mastectomy and breast conservation therapy (BCT) for patients with early-stage breast cancer. This resulted in a paradigm shift in the surgical management of early-stage breast cancer, establishing the less aggressive and disfiguring surgery as an equally effective alternative for women with early-stage breast cancer.

Despite the widespread acceptance of BCT, there has been reluctance to apply these findings to young women. For instance, a recent patterns-of-care analysis revealed that young women not only have a higher mastectomy rate, but also, the mastectomy rate among young women, in contrast to that among older women, increased during the past decade (1). Although the initial randomized trials that established the efficacy of BCT included women of all ages, young women represented a relatively small proportion of patients in these trials. Several studies have compared outcomes for young women with breast cancer undergoing either BCT or mastectomy (2−8). Some of these have suggested a higher local recurrence rate with BCT. To date, however, these studies have failed to demonstrate a survival detriment with the use of BCT in young women with breast cancer, although this may be due to small sample size and short follow-up.

The Surveillance, Epidemiology, and End Results (SEER) database is a cancer registry overseen by the National Cancer Institute that collects information regarding patient demographics, tumor characteristics, treatment course, and patient survival from approximately 26% of the U.S. population (9). The large sample size and long-term follow-up available in this database allow for comparison of local treatment modalities in the management of various cancers. Using this large, population-based database, we sought to evaluate survival outcomes with BCT and mastectomy in the management of young women with early-stage breast cancer.

Methods and Materials

The SEER database ["SEER 17 Regs Limited-Use + Hurricane Katrina Impacted Louisiana Cases, Nov 2009 Sub (1973−2007 varying)"] was queried using SEER Stat software, version 6.6.2, to identify women 20 to 39 years old diagnosed with pT1−2 N0−1 M0 invasive breast cancer between 1990 and 2007, who underwent either BCT (including lumpectomy and adjuvant radiation) or mastectomy (with or without adjuvant radiation). We limited our analysis to patients with microscopically confirmed infiltrating ductal carcinoma (IDC-O-3 morphology codes 8500, 8521, and 8523), infiltrating lobular carcinoma (ILC codes 8520 and 8524), or components of both (code 8522). Patients with a history of malignancy were excluded as these patients may have had contraindications to BCT as well as a risk of poorer survival related to recurrence of the original tumor. Patients who received lumpectomy without adjuvant radiation or with unknown extent of surgery and/or radiation were also excluded. In an effort to account for patients with poor performance status and/or those who died as a result of surgery or chemotherapy, we further excluded patients who died within 6 months of diagnosis.

Data for year of diagnosis, age at diagnosis, race, histology, grade, area of involvement within the breast, tumor size, number of positive lymph nodes, number of examined lymph nodes, estrogen receptor (ER) status, progesterone receptor (PR) status, type of local therapy, survival, and cause of death (if applicable) were extracted for all patients. Survival was defined as time from date of diagnosis to date of death or last follow-up (in months). For the purposes of analysis, age, tumor size, and number of examined lymph nodes were converted into categorical variables. Age was divided according to the following four quartiles: $\leq$33, 34 to 36, 37 to 38, and 39 years old. Tumor size was divided according to centimeters: $\leq$1.0 cm, 1.1 to 2.0 cm, 2.1 to 3.0 cm, 3.1 to 4.0 cm, and 4.1 to 5.0 cm. Finally, the number of examined lymph nodes was categorized into the following four quartiles: $\leq$5, 6 to 12, 13 to 17, and $\geq$18 lymph nodes.

We compared patient and tumor characteristics for women undergoing BCT or mastectomy, using two-sided *t*-tests and chi-squared tests. Multivariable analyses via proportional hazards regression were performed to determine which variables were independent predictors of overall survival (OS) and cause-specific survival (CSS), using the entire cohort, BCT patients only, and mastectomy patients only. Additionally, we performed a matched pair analysis between patients undergoing BCT and mastectomy, in which patients were matched by year of diagnosis, age, grade, tumor size, number of positive lymph nodes, number of examined lymph nodes, ER status, and PR status. The Kaplan-Meier product limit method provided estimates of OS and CSS; statistical significance between BCT and mastectomy was accomplished with the log-rank test statistic. Subset analyses were performed of the matched pair cohort to compare OS and CSS for patients undergoing BCT and mastectomy in each of the age quartiles.

Two-sided p values and hazard ratios (HR) for mortality, along with their 95% confidence intervals (CI), are reported here. For all analyses, our threshold for statistical significance was 0.05. Data analysis was performed using SAS and JMP software (SAS Institute, Cary, NC).

Results

Patient characteristics

We identified 14,764 women, 20 to 39 years old, who were diagnosed with T1−2 N0−1M0 breast cancer and underwent BCT or mastectomy between 1990 and 2007. The median follow-up for the entire cohort was 5.7 years (range, 0.5−17.9 years old). Of the total, 8,318 (56%) patients, 3,386 (23%) patients, and 1,019 (7%) patients had follow-up at 5, 10, and 15 years, respectively. The

Table 1 Patient characteristics

Variable	Total no. of patients (%)*	No. of mastectomy patients (%)†	No. of BCT patients (%)‡	*p* value
Follow-up				
Median	5.7	5.6	5.9	
Range	0.5−17.9	0.5−17.9	0.5−17.9	
Age at diagnosis				0.0183
≤33	3,783 (26)	2,146 (57)	1,637 (43)	
34−36	4,297 (29)	2,387 (56)	1,910 (44)	
37−38	4,125 (28)	2,225 (54)	1,900 (46)	
39	2,559 (17)	1,366 (53)	1,193 (47)	
Race				0.2215
White	9,553 (64)	5,193 (54)	4,360 (46)	
Black	1,687 (11)	912 (54)	775 (46)	
Hispanic	1,794 (12)	1,017 (57)	777 (43)	
Asian	1,595 (11)	900 (56)	695 (44)	
Other/unknown	1,89 (1)	102 (54)	87 (46)	
Histology				<0.0001
IDC	1,3570 (92)	7,380 (54)	6,190 (46)	
ILC	378 (3)	230 (61)	148 (39)	
Mixed	816 (6)	514 (63)	302 (37)	
Grade				<0.0001
Well differentiated	1,066 (7)	492 (46)	574 (54)	
Moderately differentiated	4,635 (31)	2,537 (55)	2,098 (45)	
Poorly differentiated	7,508 (51)	4,111 (55)	3,397 (45)	
Undifferentiated	433 (3)	253 (58)	180 (42)	
Unknown	1,112 (8)	721 (65)	391 (38)	
Regions involved				<0.0001
One	9,767 (66)	4,962 (50)	4,841 (50)	
Multiple	4,997 (34)	3,198 (64)	1,799 (36)	
Tumor size (cm)				<0.0001
≤1.0	2,604 (18)	1,442 (55)	1,162 (45)	
1.1−2.0	6,026 (41)	2,867 (48)	3,159 (52)	
2.1−3.0	3,878 (26)	2,245 (58)	1,633 (42)	
3.1−4.0	1,570 (11)	1,053 (67)	517 (33)	
4.1−5.0	686 (5)	517 (75)	169 (25)	
No. of positive LN				<0.0001
0	9,452 (64)	4,738 (50)	4,714 (50)	
1	2,877 (19)	1,758 (61)	1,119 (39)	
2	1,465 (10)	919 (63)	546 (37)	
3	970 (7)	709 (73)	261 (27)	
No. of examined LN				<0.0001
≤5	3,694 (25)	1,656 (45)	2,038 (55)	
6−12	4,410 (30)	2,517 (57)	1,893 (43)	
13−17	3,253 (22)	1,888 (58)	1,365 (42)	
≥18	3,407 (23)	2,063 (61)	1,344 (39)	
ER status				0.0136
Positive	8,233 (56)	4,524 (55)	3,709 (45)	
Negative	4,873 (33)	2,569 (53)	2,304 (47)	
Unknown	1,658 (11)	1,031 (62)	627 (38)	
PR status				0.1524
Positive	7,442 (50)	3,987 (54)	3,455 (46)	
Negative	5,449 (36)	2,989 (55)	2,460 (45)	
Unknown	1,873 (13)	1,148 (61)	725 (39)	

Abbreviations: ER = estrogen receptor; IDC = infiltrating ductal carcinoma; ILC = infiltrating lobular carcinoma; LN = lymph node; PR = progesterone receptor.

* n = 1,4764 patients.

† n = 8,124 patients.

‡ n = 6,640 patients.

median age for the entire cohort was 36 years old,and 64% of patients were white. The largest proportion of patients (41%) had tumors that were 1.1 to 2.0 cm in size, and the majority of patients (64%) had No disease. The majority of patients had infiltrating ductal carcinomas (92%) that were poorly differentiated (51%), although ER positive (56%) and PR positive (50%).

In total, 6,640 (45%) women underwent BCT, and 8,124 (55%) women underwent mastectomy. The proportion of patients who underwent BCT increased with patient age:43% were ≤33 years old; 44% were 34 to 36 years old; 46% were 37 to 38 years old; and 47% were 39 years old. Women undergoing BCT had smaller, lower grade, ductal (versus lobular) carcinomas involving one (versus multiple) region of the breast. Also, women undergoing BCT had fewer positive lymph nodes and fewer examined lymph nodes. Of those who underwent mastectomy, 1,386 (17%) patients received postmastectomy radiation treatment. Patient characteristics are summarized in Table 1.

Multivariable analysis for OS and CSS

Multivariable analysis for the entire cohort (Table 2) revealed that year of diagnosis, age, race, grade, PR status, tumor size, number of positive lymph nodes, and number of examined lymph nodes were independent predictors of OS and CSS. With regard to age, patients in the youngest quartile (≤33 years old) had inferior OS and CSS compared to all other women. ER status was a borderline significant predictor of OS ($p = 0.10$) but was a significant predictor of CSS ($p = 0.05$). After we controlled for all patient and tumor characteristics, BCT resulted in similar OS (HR, 0.93; CI, 0.83−1.04; $p = 0.16$) and CSS (HR, 0.93; CI, 0.83−1.05; $p = 0.26$) compared to mastectomy.

We also performed separate multivariable analyses of OS and CSS for patients undergoing BCT (Table 3) and mastectomy (Table 4). Year of diagnosis, race, grade, tumor size, and number of positive lymph nodes remained significant predictors of OS and CSS for both BCT and mastectomy patients. The number of examined lymph nodes was found to be a significant predictor of OS and CSS among patients undergoing mastectomy but not BCT. ER status was a significant predictor of CSS among patients undergoing BCT, while age and PR status were found to be significant predictors of CSS among patients undergoing mastectomy. Postmastectomy radiation treatment was not a significant predictor of OS and CSS among patients undergoing mastectomy.

Matched pair analysis for OS and CSS

Matched pair analysis included 4,644 BCT and mastectomy patients. The 5-, 10-, and 15-year OS rates for BCT and mastectomy were 92.5%, 83.5%, and 77.0% and 91.9%, 83.6%, and 79.1%, respectively ($p = 0.99$) (Fig. 1), and the 5-, 10-, and 15-year CSS rates for BCT and mastectomy were 93.3%, 85.5%, and 79.9% and 92.5%, 85.5%, and 81.9%, respectively ($p = 0.88$) (Fig. 2). Subset analyses confirmed no differences in outcomes comparing local treatment when stratified by age quartile ($p = 0.85$ for OS and $p = 0.90$ for CSS for patients ≤33 years old; $p = 0.66$ for OS and $p = 0.91$ for CSS for patients 34 to 36 years old; $p = 0.65$ for OS and $p = 0.55$ for CSS for patients 37 to 38 years old; and $p = 0.79$ for OS and $p = 0.68$ for CSS for patients 39 years old).

Table 2 Multivariable analysis for OS and CSS (entire cohort)

Variable	HR for OS (95% CI)	HR for CSS (95% CI)
Year of diagnosis*		
1990−2007	0.95 (0.93−0.96)	0.94 (0.93−0.96)
Age at diagnosis		
39 (reference)	1.00	1.00
≤33	1.17 (0.99−1.38)	1.26 (1.05−1.51)
34−36	1.03 (0.88−1.22)	1.10 (0.92−1.32)
37−38	0.95 (0.81−1.13)	0.98 (0.82−1.18)
Race		
Asian (reference)	1.00	1.00
White	1.15 (0.96−1.40)	1.16 (0.95−1.43)
Black	1.48 (1.18−1.86)	1.39 (1.09−1.78)
Hispanic	1.57 (1.25−1.98)	1.60 (1.26−2.05)
Histology		
Mixed (reference)	1.00	1.00
IDC	1.04 (0.80−1.38)	1.10 (0.82−1.50)
ILC	0.87 (0.46−1.55)	0.83 (0.40−1.58)
Grade		
Undifferentiated (reference)	1.00	1.00
Well differentiated	0.39 (0.24−0.59)	0.28 (0.16−0.47)
Moderately differentiated	0.81 (0.62−1.07)	0.81 (0.61−1.10)
Poorly differentiated	1.04 (0.81−1.36)	1.07 (0.82−1.43)
Regions involved		
Multiple (reference)	1.00	1.00
One	0.94 (0.84−1.06)	0.92 (0.82−1.04)
Tumor size (cm)		
4.1−5.0 (reference)	1.00	1.00
≤1.0	0.48 (0.37−0.64)	0.43 (0.32−0.59)
1.1−2.0	0.62 (0.50−0.78)	0.61 (0.48−0.78)
2.1−3.0	0.85 (0.68−1.06)	0.85 (0.67−1.08)
3.1−4.0	1.03 (0.82−1.32)	1.05 (0.82−1.36)
No. of positive LN		
3 (reference)	1.00	1.00
0	0.45 (0.37−0.53)	0.42 (0.35−0.51)
1	0.70 (0.58−0.85)	0.70 (0.57−0.86)
2	0.91 (0.74−1.11)	0.93 (0.75−1.15)
No. of examined LN		
≥18 (reference)	1.00	1.00
≤5	1.27 (1.04−1.55)	1.31 (1.06−1.62)
6−12	1.17 (1.02−1.35)	1.17 (1.01−1.35)
13−17	1.06 (0.92−1.22)	1.05 (0.90−1.23)
ER status		
Positive (reference)	1.00	1.00
Negative	1.14 (0.98−1.34)	1.18 (1.00−1.40)
PR status		
Positive (reference)	1.00	1.00
Negative	1.36 (1.21−1.52)	1.35 (1.20−1.53)
Local treatment		
Mastectomy (reference)	1.00	1.00
BCT	0.93 (0.83−1.04)	0.93 (0.83−1.05)

Abbreviations: CI = confidence interval; CSS = cause-specific survival; ER = estrogen receptor; HR = hazard ratio; LN = lymph node; OS = overall survival; PR = progesterone receptor.

* Year of diagnosis was analyzed as a continuous variable, with the reference being the earlier year of diagnosis.

Discussion

Our analysis of this large, population-based database suggests similar survival outcomes with either BCT or mastectomy in the local treatment of young women with early-stage breast cancer. Not only did we find similar OS and CSS in patients undergoing BCT and mastectomy on multivariable analysis, but also we performed a meticulous matched pair analysis that confirmed similar OS and CSS regardless of choice of local treatment, even in patients who were in the youngest age quartile.

Not only did we perform multivariable analyses to determine predictors of OS and CSS among the entire cohort, but we also performed separate analyses to determine predictors of outcome among patients undergoing BCT and mastectomy. For the most part, the results of these additional analyses were similar to those for the entire cohort. The reason why age was no longer a significant predictor of OS and CSS among the BCT and mastectomy patients may be due to the smaller patient numbers when we divided the cohort into two samples, as there appears to be a trend toward worse OS and CSS among the youngest patients (≤33 years old) among both BCT and mastectomy cohorts. Also, the fact that the number of examined lymph nodes was a significant predictor of OS and CSS among patients undergoing mastectomy but not BCT may be explained by a disproportionate use of sentinel lymph node biopsy among BCT patients, a factor not included in our analysis. The discrepancies in ER and PR status as predictors of OS and CSS are difficult to explain, especially without information regarding use of hormonal therapy. Finally, the lack of OS or CSS benefit with use of postmastectomy radiation treatment in this cohort is in line with general guidelines that recommend such treatment only for patients with more locoregionally advanced disease.

There is growing evidence that young women (variously defined as less than anywhere from 30 to 50 years old) with breast cancer have poorer outcomes than older women regardless of choice of local therapy. This has been attributed to many factors, including differences in genetics, tumor biology, and hormonal factors. Our study adds to the evidence that younger women with breast cancer have poorer outcomes, as, even within our cohort of women less than 40 years old, those in the youngest quartile (<33 years old) had worse OS and CSS than older women. Importantly, poorer outcomes in the youngest cohort were seen in multivariable analysis even after controlling for baseline tumor characteristics (including histology, grade, ER/PR status, T stage, and N stage).

Although the lack of local recurrence data in the SEER database precluded analysis according to this important endpoint in our study, several previous series have demonstrated increased local recurrence rates among young women undergoing BCT (10−19). The apparent differences in local recurrence rates between the BCT and mastectomy series may be at least partly explained by the difficulty in differentiating between local recurrences and secondary breast cancers in the setting of BCT. Importantly, both local recurrence and secondary breast cancer development rates are becoming less frequent with the implementation of increasingly more effective diagnostic modalities, surgical techniques, radiation delivery, and systemic therapies.

Several studies have compared BCT outcomes with those of mastectomy for young women with breast cancer (2−8). Although some of these have demonstrated increased local recurrence with BCT, to our knowledge, none have shown worse survival outcomes with BCT. For instance, in another large study, Kroman *et al.* (6)

Table 3 Multivariable analysis for OS and CSS (BCT patients only)

Variable	HR for OS (95% CI)	HR for CSS (95% CI)
Year of diagnosis*		
1990−2007	0.96 (0.94−0.99)	0.96 (0.93−0.98)
Age at diagnosis		
39 (reference)	1.00	1.00
≤33	1.14 (0.88−1.48)	1.24 (0.94−1.66)
34−36	1.05 (0.81−1.36)	1.12 (0.85−1.49)
37−38	0.95 (0.74−1.24)	1.01 (0.76−1.35)
Race		
Asian (reference)	1.00	1.00
White	1.56 (1.13−2.23)	1.74 (1.21−2.60)
Black	1.75 (1.20−2.61)	1.83 (1.20−2.87)
Hispanic	1.69 (1.14−2.56)	2.04 (1.33−3.22)
Histology		
Mixed (reference)	1.00	1.00
IDC	1.29 (0.81−2.21)	1.62 (0.94−3.15)
ILC	1.21 (0.40−3.09)	1.07 (0.24−3.43)
Grade		
Undifferentiated (reference)	1.00	1.00
Well differentiated	0.46 (0.21−0.96)	0.31 (0.11−0.78)
Moderately differentiated	1.21 (0.76−2.06)	1.38 (0.82−2.52)
Poorly differentiated	1.50 (0.96−2.51)	1.70 (1.03−3.05)
Regions involved		
Multiple (reference)	1.00	1.00
One	1.04 (0.86−1.26)	1.02 (0.84−1.26)
Tumor size (cm)		
4.1−5.0 (reference)	1.00	1.00
≤1.0	0.44 (0.26−0.76)	0.42 (0.24−0.76)
1.1−2.0	0.66 (0.43−1.08)	0.63 (0.40−1.06)
2.1−3.0	0.81 (0.52−1.32)	0.77 (0.48−1.30)
3.1−4.0	1.00 (0.62−1.70)	1.04 (0.63−1.81)
No. of positive LN		
3 (reference)	1.00	1.00
0	0.35 (0.26−0.49)	0.39 (0.29−0.53)
1	0.52 (0.37−0.75)	0.56 (0.40−0.79)
2	0.71 (0.49−1.04)	0.69 (0.48−1.00)
No. of examined LN		
≥18 (reference)	1.00	1.00
≤5	1.17 (0.85−1.61)	1.12 (0.83−1.50)
6−12	1.01 (0.80−1.28)	1.01 (0.81−1.26)
13−17	0.99 (0.78−1.25)	1.03 (0.83−1.28)
ER status		
Positive (reference)	1.00	1.00
Negative	1.16 (0.90−1.50)	1.42 (1.17−1.73)
PR status		
Positive (reference)	1.00	1.00
Negative	1.39 (1.16−1.66)	1.15 (0.87−1.50)

Abbreviations: CI = confidence interval; CSS = cause-specific survival; ER = estrogen receptor; HR = hazard ratio; IDC = infiltrating ductal carcinoma; ILC = infiltrating lobular carcinoma; LN = lymph node; OS = overall survival; PR = progesterone receptor.

* Year of diagnosis was analyzed as a continuous variable, with the reference being the earlier year of diagnosis.

Table 4 Multivariable analysis for OS and CSS (mastectomy patients only)

Variable	HR for OS (95% CI)	HR for CSS (95% CI)
Year of diagnosis*		
1990−2007	0.94 (0.92−0.96)	0.93 (0.92−0.95)
Age at diagnosis		
39 (reference)	1.00	1.00
≤33	1.17 (0.94−1.46)	1.24 (0.98−1.57)
34−36	1.02 (0.82−1.27)	1.08 (0.85−1.37)
37−38	0.93 (0.74−1.17)	0.93 (0.73−1.19)
Race		
Asian (reference)	1.00	1.00
White	0.99 (0.79−1.25)	0.97 (0.76−1.24)
Black	1.42 (1.08−1.89)	1.28 (0.95−1.73)
Hispanic	1.60 (1.22−2.12)	1.51 (1.13−2.03)
Histology		
Mixed (reference)	1.00	1.00
IDC	0.96 (0.70−1.36)	0.95 (0.68−1.39)
ILC	0.76 (0.33−1.55)	0.78 (0.32−1.66)
Grade		
Undifferentiated (reference)	1.00	1.00
Well differentiated	0.36 (0.20−0.61)	0.28 (0.14−0.51)
Moderately differentiated	0.63 (0.46−0.88)	0.60 (0.43−0.87)
Poorly differentiated	0.84 (0.62−1.15)	0.83 (0.61−1.17)
Regions involved		
Multiple (reference)	1.00	1.00
One	0.89 (0.77−1.03)	0.87 (0.74−1.01)
Tumor size (cm)		
4.1−5.0 (reference)	1.00	1.00
≤1.0	0.53 (0.38−0.73)	0.44 (0.30−0.64)
1.1−2.0	0.59 (0.46−0.78)	0.59 (0.45−0.79)
2.1−3.0	0.89 (0.69−1.15)	0.91 (0.70−1.21)
3.1−4.0	1.04 (0.79−1.37)	1.03 (0.78−1.39)
No. of positive LN		
3 (reference)	1.00	1.00
0	0.46 (0.37−0.59)	0.47 (0.38−0.59)
1	0.81 (0.63−1.04)	0.79 (0.63−1.01)
2	1.04 (0.80−1.36)	1.03 (0.80−1.32)
No. of examined LN		
≥18 (reference)	1.00	1.00
≤5	1.52 (1.13−2.02)	1.48 (1.13−1.93)
6−12	1.30 (1.07−1.58)	1.32 (1.10−1.57)
13−17	1.11 (0.91−1.35)	1.09 (0.91−1.31)
ER status		
Positive (reference)	1.00	1.00
Negative	1.14 (0.94−1.39)	1.15 (0.93−1.42)
PR status		
Positive (reference)	1.00	1.00
Negative	1.38 (1.19−1.60)	1.37 (1.17−1.60)
Postmastectomy RT		
No (reference)	1.00	1.00
Yes	1.16 (0.97−1.38)	1.19 (0.98−1.43)

Abbreviations: CI = confidence interval; CSS = cause-specific survival; ER = estrogen receptor; HR = hazard ratio; IDC = infiltrating ductal carcinoma; ILC = infiltrating lobular carcinoma; LN = lymph node; OS = overall survival; PR = progesterone receptor.

* Year of diagnosis was analyzed as a continuous variable, with the reference being the earlier year of diagnosis.

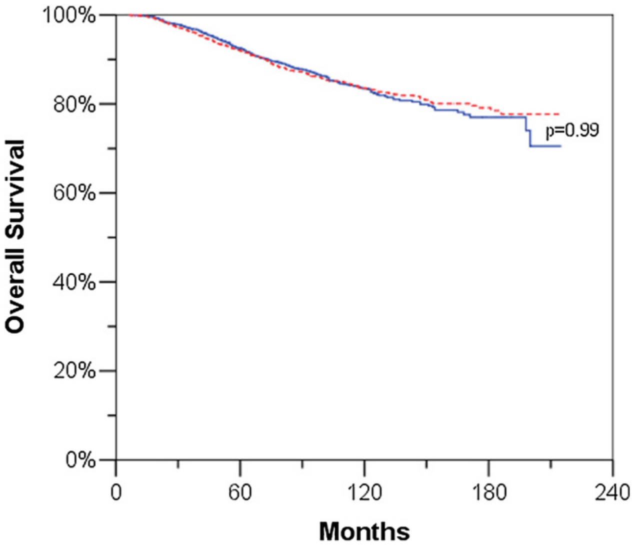

Fig. 1. Matched pair analysis of OS (red, dashed line = mastectomy; blue, solid line = BCT; $p = 0.99$).

examined a cohort of 9,285 women younger than 50 years old, diagnosed with breast cancer between 1982 and 1998, who were identified from a population-based Danish breast carcinoma database. The authors found no evidence of an increased risk of breast cancer death among women who received BCT compared with women who underwent mastectomy.

Our study, however, is now the largest dataset comparing survival outcomes between BCT and mastectomy for young women with breast cancer. Besides the large patient numbers and relatively long follow-up, our study used a stricter definition of young age (less than 40 years old) than other studies. Moreover, we restricted our analysis to patients with T1−2 N0−1 M0 breast cancer, as patients with more advanced disease are generally recommended to receive postmastectomy radiation. An analysis including patients with more advanced disease would have been misleading because BCT and mastectomy alone are not truly equivalent options for this subset of patients.

Although we adjusted for all available patient and tumor characteristics in our analyses, our study was limited by the information available in the SEER database. In an effort to account for patients with poor performance status and/or those who died as a result of surgery or chemotherapy, we excluded those patients who died within 6 months of diagnosis. As with all SEER studies, we were unable to account for the use of systemic therapies in our analysis. The indications for chemotherapy or hormonal therapy remain unchanged, however, regardless of type of local therapy; therefore, it is unlikely that patients receiving one or the other form of local therapy were more likely to receive systemic therapy. Given the young age of the patients included, one would expect that most of these patients received adjuvant chemotherapy with or without hormone therapy regardless of type of local therapy. Finally, it should be noted that although our series had a follow-up of up to 18 years, the median follow-up of 5.7 years is a function of the growth of the SEER database over time. Given the long natural history of breast cancer, further follow-up will be required to ensure equivalent survival at longer time points.

Ultimately, our findings suggest that the increasing use of mastectomy in young women may not be justified, at least on the basis of a perceived improvement in survival with mastectomy.

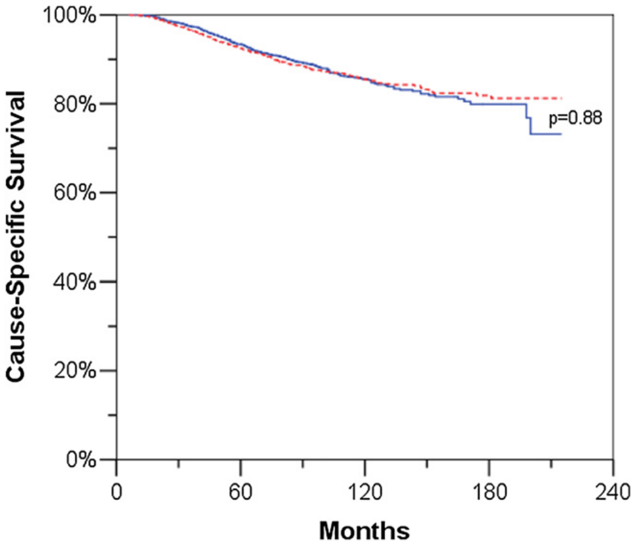

Fig. 2. Matched pair analysis of CSS (red, dashed line = mastectomy; blue, solid line = BCT; $p = 0.88$).

Although mastectomy techniques are improving, the benefits of BCT are multiple. Given the less extensive surgery involved, it is associated with less acute surgical morbidity and generally a faster recovery (although it requires a course of generally well-tolerated, outpatient radiation). Moreover, the cosmetic and functional results are typically superior to those of mastectomy with or without reconstruction. Although comparisons between the results of quality of life with BCT and those of mastectomy have been inconsistent, some studies suggest that BCT may abrogate the feelings of loss of femininity that are commonly associated with the treatment of breast cancer (20).

Conclusions

In conclusion, our analysis of this large, population-based database demonstrates similar survival outcomes with either BCT or mastectomy in the local treatment of early-stage breast cancer in young women. These patients should be counseled appropriately regarding their treatment options and should not choose a mastectomy based on the assumption of improved survival. Further study of this unique patient population is, nonetheless, warranted.

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