



Original Research

Survival outcomes of patients with lobular carcinoma *in situ* who underwent bilateral mastectomy or partial mastectomy



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Abstract *Aim:* To compare the survival outcomes between patients treated with bilateral mastectomy and partial mastectomy alone as the initial surgical management for primary lobular carcinoma *in situ* (LCIS).

Patients and methods: Patients with histologically confirmed LCIS underwent partial mastectomy alone or bilateral mastectomy were identified by the SEER*Stat database (version 8.3.2) released in 2016. The primary outcome measure was all-cause mortality and the secondary outcome measure was breast cancer-specific mortality.

Results: Of the 5964 cases included in the analysis, 208 cases underwent bilateral mastectomy and 5756 cases underwent partial mastectomy alone. The 1-, 5- and 10-year estimated overall survival rates were 99.7%, 96.7% and 91.7%, respectively. Univariate and multivariate proportional hazards regression (Cox) analyses showed no significant difference between the risk of all-cause mortality in the bilateral mastectomy group compared with the partial mastectomy

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group (HR = 1.106, 95% confidence interval [CI] 0.350–3.500, P = 0.86). In propensity score-matched model, bilateral mastectomy still did not show benefit to overall mortality (HR = 2.248, 95% CI 0.451–11.200). Patients older than 60 years of age showed a higher risk of all-cause mortality (HR = 7.593, 95% CI 5.357–10.764, P < 0.0001). No risk factors, including surgery type, were identified for breast cancer-specific survival.

Conclusions: Survival outcomes of patients with LCIS who underwent partial mastectomy without radiotherapy were not inferior to patients who underwent bilateral prophylactic mastectomy. Breast cancer-specific mortality in patients with LCIS was extremely low; aggressive prophylactic surgery like bilateral prophylactic mastectomy should not be advocated for most patients with LCIS.

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1. Introduction

Lobular carcinoma *in situ* (LCIS) has long been considered a precursor or risk factor for the subsequent development of invasive breast cancer. Previous studies have documented that the relative risk of developing subsequent invasive breast cancer is approximately two-fold higher in LCIS patients than in individuals without LCIS, and the absolute risk is approximately 1% per year [1–6]. A series of 4853 cases of patients diagnosed with LCIS that were registered to the Surveillance, Epidemiology and End Results (SEER) program between 1973 and 1998 found that the risk of developing invasive breast cancer after LCIS was 7.1% at 10 years, with equal predisposition to both breasts [6].

The optimal initial management of LCIS varies among breast surgeons [7]. For patients with classic LCIS without concomitant invasive disease or ductal carcinoma *in situ* (DCIS), current treatment guideline does not recommend further surgery for treatment purpose but directs it to risk-reduction consultation [8]. Risk-reduction bilateral total mastectomy remains a consensus by the NCCN Breast Cancer Risk Reduction Panel as an option for women with LCIS even without other risk factors [9], although it is not a recommended approach for most of these patients, and it is unclear whether this prophylactic approach results in improved survival outcomes.

Due to the low incidence and mortality rate of LCIS, the overall survival outcome after treatment is seldom discussed in LCIS studies. In a National Surgical Adjuvant Breast and Bowel Project (NSABP) study of 180 LCIS patients, only one patient died of recurrence of previous ipsilateral invasive carcinoma and one patient died of subsequent contralateral breast cancer, with a breast cancer-specific mortality rate of 1.1% [5]. In a meta-analysis of 389 LCIS patients, the breast cancer-specific mortality rate among women who had a local excision was 2.8%, which was not significantly different from the disease-specific mortality rate in women who were initially treated with mastectomy [10]. However, due to the small sample size and heterogeneity of the data, these studies were not powerful enough to illustrate the effect of different local management strategies on breast

cancer-specific survival after a diagnosis of primary LCIS (i.e. LCIS as the first tumour in a patient).

The SEER program of the National Cancer Institute (NCI) is a population-based cancer registry covering approximately 30% of the population in the United States. This database is the largest publicly available and authoritative information source on cancer incidence and survival. Using this reliable and large-scale research data set, we were able to statistically analyse the survival outcomes for patients with LCIS.

The objective of this study was to evaluate the difference between bilateral mastectomy and partial mastectomy on the overall survival of patients diagnosed with primary LCIS using the case information extracted from the SEER research database.

2. Patients and methods

The SEER*Stat database, which was released by the Surveillance Research Program at the NCI in 2016, was used as the data source in the present study [11]. Women diagnosed with LCIS (ICD-O-3 Histology code 8520:2) were identified in the SEER 13 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1992–2011 varying) incidence database. We chose the SEER 13 Regs research database because it also contains information of multiple primaries. Therefore, we are able to exclude concurrent malignancy (defined as *in situ* or invasive cancer diagnosed within 6 months of LCIS diagnosis) by implementing the MP-SIR session of the SEER*Stat software. Because the database does not include detailed information on local surgery treatment before 1998, we only included histologically confirmed cases diagnosed between January 1998 and December 2011. Patients with a prior history of any type of *in situ* or invasive cancer, or patients who were only initially identified by autopsy, death certificate or cytology, were excluded from the study. Based on information regarding surgery and radiotherapy treatment, the patients were categorised into three groups: partial mastectomy only (including partial mastectomy with nipple resection, lumpectomy or excisional biopsy, re-excision of the biopsy site for gross or

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