

PICO #3- Surgery

Summary: 54 y/o female presents to breast clinic to discuss results of recent core needle biopsy that confirms invasive ductal carcinoma (estrogen receptor positive, HER2 negative), Stage IIA Breast cancer. Discussion with patient about treatment options including breast conserving surgery (lumpectomy) with sentinel lymph node biopsy and adjuvant radiation) or total mastectomy with or without reconstruction.

Search Question: In women 18 years or older with stage I–II invasive breast cancer, does breast-conserving surgery with sentinel lymph node biopsy and adjuvant radiation compared to mastectomy (with or without reconstruction) result in differences in overall survival, recurrence, and patient-reported quality of life over long-term follow-up?

Question Type:

- ☐ Prevalence
- ☐ Screening
- ☐ Diagnosis
- ☐ Prognosis
- ☐ **Treatment**
- ☐ Harms

In the absence of meta-analyses or systematic reviews, other high-quality study designs that may be used include randomized controlled trials, cohort studies, case-control, or cross-sectional studies. Randomized controlled trials provide the strongest primary evidence and is the gold standard when evaluating an intervention. Additionally, prospective and retrospective cohort studies, particularly those using large U.S. databases, can be used to compare outcomes between breast-conserving therapy and mastectomy. Case-control and cross-sectional studies may also be included, especially when evaluating outcomes such as recurrence or patient-reported quality of life.

PICO Search Terms

P	I	C	O
Breast cancer	Breast conserving therapy	Mastectomy	Survival
Breast carcinoma	Breast conserving surgery	Total mastectomy	Mortality
Breast neoplasm	Lumpectomy		Recurrence
Early stage breast cancer	BCS		Quality of life

Stage I breast cancer	Radiation therapy		
Stage II breast cancer	Radiotherapy		

Search tools and strategy used:

Please indicate what databases/tools you used

Provide a list of the terms you searched together in each tool

How many articles were returned using those terms and filters.

Explain how you narrowed your choices to the few selected articles.

For example, if your search returned 25 articles among the several databases used, what was the process used to determine which four articles to use?

PubMed:

Search Terms:

("breast neoplasms"[MeSH Terms] OR "breast cancer"[tiab] OR "breast carcinoma"[tiab] OR "early stage breast cancer"[tiab] OR "stage I breast cancer"[tiab] OR "stage II breast cancer"[tiab])

AND ("breast conserving surgery"[tiab] OR "lumpectomy"[tiab] OR "breast conservation therapy"[tiab] OR "BCS"[tiab])

AND ("mastectomy"[tiab] OR "total mastectomy"[tiab])

AND ("radiotherapy"[MeSH Terms] OR "radiation therapy"[tiab] OR "radiotherapy"[tiab])

AND ("survival"[tiab] OR "mortality"[tiab] OR "recurrence"[tiab] OR "quality of life"[MeSH Terms] OR "quality of life"[tiab])

Results found: 435

With filter: 333 (10 years)

Cochrane Library:

Search Terms:

breast cancer AND (lumpectomy OR mastectomy OR "breast conserving surgery")

Results found: 26

With filters: 17 (10 years)

Google Scholar:

Search terms:

"breast conserving surgery" AND mastectomy AND radiotherapy AND "early stage breast cancer" AND survival AND "United States"

Results found: 8,690

With filters: 5020 (last 10 years)

I decided to use three articles from PubMed. I narrowed down my selection by first skimming the title. If the title seemed relevant, I would skim the abstract to see if it pertained to my PICO. After that I would skim the rest of the article to see how it pertains to my PICO in addition to reviewing the level of evidence and the study type/design.

Results found

1. Yi, M., Chavez-MacGregor, M., Smith, B. D., Mitchell, M. P., Caudle, A. S., DeSnyder, S. M., Kuerer, H. M., & Hunt, K. K. (2025). Comparing Survival Differences between Patients Undergoing Breast-Conserving Therapy Versus Total Mastectomy as a First Treatment for Early Stage Breast Cancer. *Annals of surgical oncology*, 32(13), 9757–9766. <https://doi.org/10.1245/s10434-025-18030-0>

Abstract:

Purpose: To evaluate trends in the total mastectomy (TM) rates in patients with early-stage breast cancer (BC) undergoing surgery first at a single institution and compare overall (OS), distant metastasis-free (DMFS), local-regional recurrence (LRR) and BC-specific (BCSS) survival between lumpectomy followed by radiation (BCT) and TM.

Methods: 8,967 women with clinical stage T1–2, N0–1, M0 BC who underwent upfront surgery from 1/1/2000 to 12/31/2014 were included. TM rates were evaluated. Inverse probability weighting (IPW) based on propensity scores was used to remove confounding in the survival models in the whole cohort and subsets analyses (different stage combined with different hormone receptor status).

Results: TM rates increased from 39.7% to 59.9% ($P < 0.001$) in patients aged ≤ 50 from 2005-2013. At a median follow-up of 6.1 years, after IPW adjustment, patients undergoing BCT or TM with radiation had slightly worse BCSS and similar OS, DMFS, and LRR rates compared to patients who underwent TM alone in the whole cohort. In subset analyses, after IPW adjustment, there were no significant survival differences in OS, BCSS, and DMFS between patients who underwent TM without radiation vs. BCT. Among patients with triple-negative BC and stage I disease, those who underwent BCT had a lower LRR rate than those undergoing TM (RR, 0.5; $P = 0.02$).

Conclusions: Our study shows that BCT and TM are equivalent as an initial surgical strategy for patients with early-stage breast cancer. These data may help physicians in decision-making for patients who are candidates for either TM or BCT.

Key Points:

- Retrospective cohort of 8,967 U.S. women with early-stage breast cancer
- Compared breast-conserving therapy (lumpectomy + radiation) vs mastectomy
- Survival and recurrence were similar after propensity score adjustment

Selection Explanation: I selected this article because it directly compares breast conserving and mastectomy in a U.S. cohort, reports outcomes relevant to my PICO (survival, recurrence), and uses a large, contemporary dataset to approximate real-world effectiveness.

2. Li, H., Tian, S., Wu, J., Li, S., Xiao, J., Chen, Y. L., Song, J. Y., Pan, Q., Liang, X. Y., She, R. L., Ma, C. Y., Wu, K. N., & Kong, L. Q. (2025). Survival comparison of breast conserving therapy and mastectomy with breast reconstruction for breast cancer using propensity score matched cohort. *Scientific reports*, 15(1), 30310.

<https://doi.org/10.1038/s41598-025-16215-x>

Abstract: Cohort studies have suggested that breast-conserving therapy (BCT) offers better survival outcomes compared to mastectomy in patients with early breast cancer (BC). However, survival comparisons between BCT and mastectomy with breast reconstruction (Mastectomy + BR) are lacking. To investigate this, we conducted a cohort study using data from the SEER database. Patients with first-diagnosed locoregional BC between 2010 and 2016 were included and categorized into BCT and Mastectomy + BR groups. Propensity score matching (PSM) was performed to reduce selection bias. Breast cancer-specific survival (BCSS) and overall survival (OS) were compared between the groups. After PSM, 56,420 patients were matched (1:1) into the BCT and Mastectomy + BR groups. No significant differences in BCSS or OS were observed between the two matched groups overall. However, subgroup analyses based on tumor size and nodal status showed that, among patients with node-negative and tumors ≤ 5 cm, Mastectomy + BR was associated with decreased BCSS compared to BCT (HR 1.23, 95% CI 1.02–1.49, $P = 0.03$). Inferior BCSS for Mastectomy + BR was also observed in tumors located in the upper-outer quadrant (HR 1.54, 95% CI 1.07–2.20, $P = 0.02$), nipple & central area (HR 4.98, 95% CI 1.44–17.21, $P = 0.01$), and in triple-negative BC (HR 1.45, 95% CI 1.07–1.98, $P = 0.02$). Additionally, in triple-negative BC, Mastectomy + BR was associated with worse OS (HR 1.33, 95% CI 1.00–1.76, $P = 0.048$). For patients with node-positive or tumors > 5 cm, no significant differences in BCSS or OS were found between the BCT and Mastectomy + BR groups, except in the HER2-enriched subtype, where Mastectomy + BR was associated with improved BCSS (HR 0.43, 95% CI 0.22–0.85, $P = 0.015$) and a marginal better OS (HR 0.54, 95% CI 0.29–1.01, $P = 0.055$). This study suggests that, except for the HER2-enriched subtype, BCT remains an equivalent or, in specific clinical scenarios, a superior alternative to Mastectomy + BR for the treatment of breast cancer.

Key points:

- Large retrospective cohort using SEER (U.S.) data comparing breast-conserving therapy (lumpectomy + radiation) vs mastectomy with reconstruction

- Propensity score matching used to reduce selection bias
- No overall differences in overall survival or breast cancer–specific survival between groups
- Subgroup analyses showed better survival for BCT in node-negative tumors ≤5 cm and some molecular subtypes
- Authors are from China, but all patient data are U.S.-based.

Selection Explanation: Provides U.S. population-level evidence on survival and recurrence for breast-conserving therapy vs mastectomy, directly addressing the clinical outcomes in my PICO.

3. Hanson, S. E., Lei, X., Roubaud, M. S., DeSnyder, S. M., Caudle, A. S., Shaitelman, S. F., Hoffman, K. E., Smith, G. L., Jagsi, R., Peterson, S. K., & Smith, B. D. (2022). Long-term Quality of Life in Patients With Breast Cancer After Breast Conservation vs Mastectomy and Reconstruction. *JAMA surgery*, 157(6), e220631. <https://doi.org/10.1001/jamasurg.2022.0631>

Abstract:

Importance: Treatment options for early breast cancer include breast-conserving surgery with radiation therapy (RT) or mastectomy and breast reconstruction without RT. Despite marked differences in these treatment strategies, little is known with regard to their association with long-term quality of life (QOL).

Objective: To evaluate the association of treatment with breast-conserving surgery with RT vs mastectomy and reconstruction without RT with long-term QOL.

Design, Setting, and Participants: This comparative effectiveness research study used data from the Texas Cancer Registry for women diagnosed with stage 0-II breast cancer and treated with breast-conserving surgery or mastectomy and reconstruction between 2006 and 2008. The study sample was mailed a survey between March 2017 and April 2018. Data were analyzed from August 1, 2018 to October 15, 2021.

Exposures: Breast-conserving surgery with RT or mastectomy and reconstruction without RT.

Main Outcomes and Measures: The primary outcome was satisfaction with breasts, measured with the BREAST-Q patient-reported outcome measure. Secondary outcomes included BREAST-Q physical well-being, psychosocial well-being, and sexual well-being; health utility, measured using the EuroQol Health-Related Quality of Life 5-Dimension,

3-Level questionnaire; and local therapy decisional regret. Multivariable linear regression models with weights for treatment, age, and race and ethnicity tested associations of the exposure with outcomes.

Results: Of 647 patients who responded to the survey (40.0%; 356 had undergone breast-conserving surgery, and 291 had undergone mastectomy and reconstruction), 551 (85.2%) confirmed treatment with breast-conserving surgery with RT (n = 315) or mastectomy and reconstruction without RT (n = 236). Among the 647 respondents, the median age was 53 years (range, 23-85 years) and the median time from diagnosis to survey was 10.3 years (range, 8.4-12.5 years). Multivariable analysis showed no significant difference between breast-conserving surgery with RT (referent) and mastectomy and reconstruction without RT in satisfaction with breasts (effect size, 2.71; 95% CI, -2.45 to 7.88; $P = .30$) or physical well-being (effect size, -1.80; 95% CI, -5.65 to 2.05; $P = .36$). In contrast, psychosocial well-being (effect size, -8.61; 95% CI, -13.26 to -3.95; $P < .001$) and sexual well-being (effect size, -10.68; 95% CI, -16.60 to -4.76; $P < .001$) were significantly worse with mastectomy and reconstruction without RT. Health utility (effect size, -0.003; 95% CI, -0.03 to 0.03; $P = .83$) and decisional regret (effect size, 1.32; 95% CI, -3.77 to 6.40; $P = .61$) did not differ by treatment group.

Conclusions and Relevance: The findings support equivalence of breast-conserving surgery with RT and mastectomy and reconstruction without RT with regard to breast satisfaction and physical well-being. However, breast-conserving surgery with RT was associated with clinically meaningful improvements in psychosocial and sexual well-being. These findings may help inform preference-sensitive decision-making for women with early-stage breast cancer.

Key Points:

- Prospective cohort using Texas Cancer Registry data to compare quality of life outcomes
- Examines patient-reported outcomes following breast-conserving surgery + radiotherapy vs mastectomy (with or without reconstruction)
- Uses validated instruments to measure satisfaction, physical well-being, psychosocial well-being, and sexual well-being
- Found that breast-conserving surgery was associated with higher psychosocial and sexual well-being compared to mastectomy

Selection Explanation: I selected this article because it evaluates patient-reported quality of life outcomes for the surgical options in my PICO using validated measures in a U.S. population-based cohort, directly addressing the quality of life component of my research question.

Clinical Bottom Line:

Evidence from three U.S. based studies demonstrate that for women with early-stage breast cancer, breast-conserving surgery, such as lumpectomy with radiation, provides survival outcomes equivalent to mastectomy, with no significant differences in overall survival or breast cancer specific survival. Registry and institution based analyses show that this equivalence holds across most tumor sizes and nodal stages, with some subgroups even favoring breast conserving therapy for node negative tumors. Additionally, patient reported outcomes indicate that breast conserving surgery is associated with better psychosocial and sexual well-being compared to mastectomy with reconstruction, emphasizing that it is both oncologically safe and associated with higher quality of life. Overall, these data support breast conserving therapy plus radiation as a standard, patient centered option for appropriately selected women with early stage invasive breast cancer.