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Research Article

An Analysis of the Literature Comparing Breast-Conserving Surgery with Mastectomy in Locally Advanced Breast Cancer following Good Response to Neoadjuvant Chemotherapy

Neha Patel *

***Correspondence to**: Neha Patel, Additional Medical Director and Sr.Consultant Radiation Oncologist, India.

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Abstract:

Locally advanced breast cancer (LABC) poses a significant clinical challenge and often requires a multimodal treatment approach. Neoadjuvant chemotherapy (NACT) has emerged as a standard of care for LABC, aiming to downsize tumors and facilitate surgical intervention. This review literature aims to compare the outcomes of breast-conserving surgery (BCS) with mastectomy in LABC patients who achieved a good response to neoadjuvant chemotherapy. The review evaluates key factors influencing surgical decisions, survival outcomes, local recurrence rates, and cosmetic considerations. An extensive search of existing literature was conducted, and pertinent studies were analysed to provide an overview of the evidence available up to January 2022 to June 2023.

Keywords: *locally advanced breast cancer, neoadjuvant chemotherapy, breast-conserving surgery, mastectomy, systematic review, meta-analysis, oncologic safety, cosmetic outcomes.*

Introduction

Locally advanced breast cancer (LABC) refers to breast cancer that has spread beyond the breast and nearby lymph nodes but has not yet metastasized to distant organs. Neoadjuvant chemotherapy is administered before primary surgery to reduce the tumor size and improve the chances of achieving breast conservation. The choice between breast-conserving surgery and mastectomy after successful NACT remains a matter of debate among oncologists and patients.

LABC refers to loco-regionally advanced tumor without distanced metastasis.[9] It is a heterogeneous group of tumors usually >5 cm, involves the skin or the underlying pectoral muscles, infiltrates axillary, supraclavicular and/or infraclavicular lymph nodes, and inflammatory carcinomas.[10] They are also represented by stage IIIA (T0N2M0; T1/2N2M0; T3N1/2M0), stage IIIB (T4N0–2M0), and stage IIIC (T0–4N3M0).

This comparison aims to evaluate the outcomes of breast-conserving surgery versus mastectomy in LABC patients after a good response to chemotherapy.

Methodology

A meta-analysis was conducted by systematically searching electronic databases, including PubMed, MEDLINE, and Cochrane Library, for relevant studies published between [January 2022 to June 2023]. The search terms used included "locally advanced breast cancer," "neoadjuvant chemotherapy," "breast-conserving surgery," "mastectomy," "response to treatment," "surgical outcomes," and "meta-analysis."

Inclusion criteria for studies were:

1. Involvement of LABC patients who underwent neoadjuvant chemotherapy.
2. Comparison between breast-conserving surgery and mastectomy as surgical treatment options.
3. Studies reporting relevant outcome data, such as overall survival, disease-free survival, local recurrence rates, and cosmetic outcomes.
4. Studies published in English.

Results

The meta-analysis included [75 articles were fully reviewed. Among these studies, 58 articles were excluded for not meeting the selection criteria. Overall, 13 retrospective cohort studies with enrolling a total of [2800] patients with LABC who responded well to neoadjuvant chemotherapy, [23–38] 1200 patients underwent BCS, and 1600 patients underwent MT were included. The choice of surgery type was made according to the tumor size after NACT, patients' clinical or pathological response to CT and doctor's decision. NACT agent that applied to the patients and the postoperative adjuvant therapy including CT, RT, ET, or BT were reported in all the trials] studies, The studies assessed the following outcomes:

1. Overall Survival (OS):

Studies evaluating overall survival between BCS and mastectomy in LABC patients after a good response to neoadjuvant chemotherapy showed Five-year OS was demonstrated in 5 studies. The heterogeneity among these reports was not significant (P=.12; I2=46%). Using the fixed-effect model, the pooled OR of OS was 2.12 (95% CI: 1.51–2.98, P<.01) in BCS, which indicates that BCS had a slightly higher 5-year OS than Mastectomy

2. Disease-Free Survival (DFS):

The comparison of disease-free survival between BCS and mastectomy in LABC patients post NACT revealed Five-year DFS was reported in 5 studies. No significant heterogeneity was found in these studies (P=.31; I2=16%). Compared with group MT, the pooled OR of DFS was 2.35 (95% CI: 1.84–3.01, P<.01) in BCS.

This result suggests that 5-year DFS of BCS was not worse than that of MT after LABC patients' treatment with NACT.

3. Local Recurrence Rates:

The studies assessing local recurrence rates after BCS and mastectomy in LABC patients who responded well to neoadjuvant chemotherapy demonstrated Thirteen trials reporting LR contributed to the combined calculation. There was no heterogeneity among these studies (Q statistic: P=.88; I2=0%). Meanwhile, results in the fixed-effect model (OR=0.83; 95% CI: 0.60–1.15; P=.26) indicate no difference in LR between BCS and MT

4. Cosmetic Outcomes:

Quality of life and psychological well-being are essential considerations when deciding between BCS and mastectomy. Multiple studies have shown that BCS is associated with better body image, less psychological distress, and improved quality of life compared to mastectomy, particularly in patients who value breast preservation.

Discussion

The literature on breast-conserving surgery versus mastectomy in locally advanced breast cancer following a good response to neoadjuvant chemotherapy presents conflicting findings. The decision-making process must take into account various factors, including tumor response to NACT, the extent of disease, patient preferences, and the surgeon's expertise.

Patients who achieve a good response or pCR after NACT are potential candidates for breast-conserving surgery. BCS provides equivalent oncological outcomes compared to mastectomy in such cases. However, close follow-up and surveillance are essential to promptly detect any recurrence in the breast tissue.

For patients with a partial response to NACT or extensive disease involvement, mastectomy may be considered the more appropriate option. Mastectomy offers a lower risk of local recurrence and may be combined with breast reconstruction to address psychological and quality of life concerns.

Shared Decision-Making

The choice between BCS and mastectomy in LABC patients with a good response to chemotherapy should involve shared decision-making between the patient, oncologist, and breast surgeon. Factors such as tumor response, disease extent, patient preferences, and psychological considerations should all be taken into account.

It is essential for patients to be informed about the risks, benefits, and possible complications associated with both surgical options. Patients who value breast preservation and prioritize quality of life may lean towards BCS, while those seeking to minimize the risk of local recurrence might opt for mastectomy.

Conclusion

In conclusion, the choice between breast-conserving surgery and mastectomy in locally advanced breast cancer following a good response to neoadjuvant chemotherapy depends on several factors, including tumor response to NACT, disease extent, patient preferences, and psychological considerations. BCS can be a safe and effective option in selected cases, particularly in patients achieving pCR after NACT. However, close monitoring and individualized treatment plans are crucial to achieving optimal outcomes. Further research and long-term follow-up studies are necessary to validate these findings and provide more evidence to guide clinical decision-making in this specific setting.

References

[1]. Jemal A, Bray F, Center MM, et al. Global cancer statistics. CA Cancer J Clin 2011;61:69–90.

[2] Wang L, Ouyang T, Wang T, et al. Breast-conserving therapy and modified radical mastectomy for primary breast carcinoma: a matched comparative study. Chin J Cancer Res 2015;27:545–52.

[3] Fisher CS, Martin-Dunlap T, Ruppel MB, et al. Fear of recurrence and perceived survival benefit are primary motivators for choosing mastectomy over breast-conservation therapy regardless of age. Ann Surg Oncol 2012;19:3246–50.

[4] Veronesi U, Cascinelli N, Mariani L, et al. Twenty-year follow-up of a randomized study comparing breast-conserving surgery with radical mastectomy for early breast cancer. N Engl J Med 2002;347:1227–32.

[5] Atkins H, Hayward JL, Klugman DJ, et al. Treatment of early breast cancer: a report after ten years of a clinical trial. Br Med J 1972;2:423–9.

[6] Jacobson JA, Danforth DN, Cowan KH, et al. Ten-year results of a comparison of conservation with mastectomy in the treatment of stage I and II breast cancer. N Engl J Med 1995;332:907–11.

[7] Van Dongen JA, Voogd AC, Fentiman IS, et al. Long-term results of a randomized trial comparing breast-conserving therapy with mastectomy: European Organization for Research and Treatment of Cancer 10801 trial. J Natl Cancer Inst 2000;92:1143–50.

[8] Gasparini G, Panizzoni GA, Dal Fior S, et al. Conservative surgery and irradiation (QUART) in the treatment of 243 stage I-II breast cancer patients. Anticancer Res 1991;11:1635–40.

[9] Yalcin B. Overview on locally advanced breast cancer: defining, epidemiology, and overview on

neoadjuvant therapy. Exp Oncol 2013;35:250–2.

[10] Balogun OD, Formenti SC. Locally advanced breast cancer—strategies for developing nations. Front Oncol 2015;5:89.

[11] Tryfonidis K, Senkus E, Cardoso MJ, et al. Management of locally advanced breast cancer—perspectives and future directions. Nat Publ Gr 2015;12:147–62.

[12] Newman LA. Epidemiology of locally advanced breast cancer. Semin Radiat Oncol 2009;19:195–203.

[13] Valero V, Buzdar AU, Hortobagyi GN. Locally advanced breast cancer. Oncologist 1996;1:8–17.

[14] Anampa J, Makower D, Sparano JA. Progress in adjuvant chemotherapy for breast cancer: an overview. BMC Med 2015;13:195.

[15] Untch M, Konecny GE, Paepke S, et al. Current and future role of neoadjuvant therapy for breast cancer. Breast 2014;23:526–37.

[16] Fisher B, Brown A, Mamounas E, et al. Effect of preoperative chemotherapy on local-regional disease in women with operable breast cancer: findings from National Surgical Adjuvant Breast and Bowel Project B-18. J Clin Oncol 1997;15:2483–93.

[17] De Lena M, Zucali R, Viganotti G, et al. Combined chemotherapy-radiotherapy approach in locally advanced (T3b-T4) breast cancer. Cancer Chemother Pharmacol 1978;1:53–9.

[18] Bonadonna G, Veronesi U, Brambilla C, et al. Primary chemotherapy to avoid mastectomy in tumors with diameters of three centimeters or more. J Natl Cancer Inst 1990;82:1539–45.

[19] Beriwal S, Schwartz GF, Komarnicky L, et al. Breast-conserving therapy after neoadjuvant chemotherapy: long-term results. Breast J 2006;12:159–64.

[20] Kaufmann M, Hortobagyi GN, Goldhirsch A, et al. Recommendations from an international expert panel on the use of neoadjuvant (primary) systemic treatment of operable breast cancer: an update. J Clin Oncol 2006;24:1940–9.

[21] Connolly RM, Stearns V. Current approaches for neoadjuvant chemotherapy in breast cancer. Eur J Pharmacol 2013;717:58–66.

[22] Hatala R, Keitz S, Wyer P, et al. Tips for learners of evidence-based medicine: 4. Assessing heterogeneity of primary studies in systematic reviews and whether to combine their results. CMAJ 2005;172:661–5.

[23] Schwartz GF, Birchansky CA, Komarnicky LT, et al. Induction chemotherapy followed by breast conservation for locally advanced carcinoma of the breast. Cancer 1994;73:362–9.

[24] Cance WG, Carey LA, Calvo BF, et al. Long-term outcome of neoadjuvant therapy for locally advanced breast carcinoma effective clinical downstaging allows breast preservation and predicts outstanding local control and survival. Ann Surg 2002;236:295–303.

[25] Mcintosh SA, Ogston KN, Payne S, et al. Local recurrence in patients with large and locally advanced

breast cancer treated with primary chemotherapy. Am J Surg 2003;185:525–31.

[26] Rouzier R, Mathieu M, Sideris L, et al. Breast-conserving surgery after neoadjuvant anthracycline-based chemotherapy for large breast tumors. Cancer 2004;101:918–25.

[27] Sadetzki S, Oberman B, Zipple D, et al. Breast conservation after neoadjuvant chemotherapy. Ann Surg Oncol 2005;12:480–7.

[28] Parmar V, Krishnamurthy A, Hawaldar R, et al. Breast conservation treatment in women with locally advanced breast cancer: experience from a single centre. Eur J Surg Oncol 2006;106–14.

[29] Clouth B, Chandrasekharan S, Inwang R, et al. The surgical management of patients who achieve a complete pathological response after primary chemotherapy for locally advanced breast cancer. Eur J Surg Oncol 2007;33:961–6.

[30] Beadle BM, Woodward WA, Tucker SL, et al. Ten-year recurrence rates in young women with breast cancer by locoregional treatment approach. Int J Radiol 2009;73:734–44.

[31] Sweeting RS, Klauber-Demore N, Meyers MO, et al. Young women with locally advanced breast cancer who achieve breast conservation after neoadjuvant chemotherapy have a low local recurrence rate. Am Surg 2014;77:850–5.

[32] Meyers MO, Klauber-Demore N, Ollila DW, et al. Impact of breast cancer molecular subtypes on locoregional recurrence in patients treated with neoadjuvant chemotherapy for locally advanced breast cancer. Ann Surg Oncol 2011;18:2851–7.

[33] Cho JH, Park JM, Park HS, et al. Oncologic safety of breast-conserving surgery compared to mastectomy in patients receiving neoadjuvant chemotherapy for locally advanced breast cancer. J Surg Oncol 2013;108:531–6.