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Breast Conservative Surgery vs. Modified Radical Mastectomy in Early Breast Cancer: A Comparative Analysis of 126 Cases from 2022 to 2023

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ABSTRACT

Objectives: To compare the oncological outcomes, surgical complications, patient satisfaction, and quality of life (QoL) between Breast-Conserving Surgery (BCS) and Modified Radical Mastectomy (MRM) in the management of early-stage breast cancer.

Material and Methods: This retrospective study, conducted at Bharath Cancer Hospital, Mysore, included 126 patients diagnosed with early-stage breast cancer from 2022 to 2023. The patients were divided into two groups: 68 underwent BCS and 58 underwent MRM. Data on patient demographics, tumor characteristics, surgical outcomes, adjuvant therapies, and patient satisfaction were collected. Statistical analysis was performed to compare local recurrence rates, disease-free survival (DFS), overall survival (OS), postoperative complications, and QoL between the two groups.

Results: There was no significant difference in local recurrence rates, DFS, or OS between the BCS and MRM groups. However, BCS patients reported significantly higher cosmetic satisfaction and QoL scores ($p < 0.001$). The BCS group had fewer postoperative complications (7.4% vs. 24.1%, $p = 0.008$) but exhibited a higher reoperation rate (11.8% vs. 3.4%, $p = 0.045$).

Conclusion: BCS provides comparable oncological outcomes to MRM in early-stage breast cancer while offering superior patient satisfaction and fewer postoperative complications. These results emphasize the importance of personalized treatment planning, considering patient preferences and QoL.

Keywords: Breast-Conserving Surgery (BCS), Modified Radical Mastectomy (MRM), Early-Stage Breast Cancer, Oncological Outcomes, Quality of Life

INTRODUCTION

Breast cancer is the most prevalent malignancy among women globally. Advances in early detection and treatment options have significantly improved survival rates. Two primary surgical strategies for early-stage breast cancer are Breast Conservative Surgery (BCS) and Modified Radical Mastectomy (MRM). While BCS aims to remove the tumor while preserving as much breast tissue as possible, MRM involves the complete removal of the breast along with axillary lymph nodes. The choice between these surgical options is influenced by various factors,

including tumor size, location, patient preference, and the overall clinical scenario.

Objectives

This article aims to compare the outcomes of BCS and MRM in early breast cancer based on data from 126 cases treated between 2022 and 2023 and to compare these findings with results from major clinical trials and studies.

MATERIAL AND METHODS

Study Design: Retrospective observational study.

Study Population: 126 patients diagnosed with early-stage breast cancer (T1-2, N0-1, M0) treated with either BCS or MRM between January 2022 and December 2023.

Inclusion Criteria: Women aged 25–75 years with a confirmed diagnosis of early-stage breast cancer, who underwent BCS or MRM.

Exclusion Criteria: Patients with metastatic disease, bilateral breast cancer, or those who received neoadjuvant chemotherapy.

Data Collection: Patient demographics, tumor characteristics, surgical outcomes, adjuvant therapy, and follow-up data were collected from medical records.

Statistical Analysis: Data were analyzed using SPSS software. Comparisons between groups were made using chi-square tests for categorical variables and *t*-tests for continuous variables. A p-value < 0.05 was considered statistically significant.

RESULTS

The study included 126 patients, with 68 undergoing BCS and 58 undergoing MRM. The median follow-up was 18 months [Table 1].

Table 1: Patient demographics and tumor characteristics.

Parameter	BCS group (n=68)	MRM group (n=58)	p-value
Age (mean ± SD)	52.3 ± 10.1	54.7 ± 9.6	0.241
Tumor size (cm, mean ± SD)	2.1 ± 0.7	3.2 ± 1.1	<0.001
Hormone receptor positive	54 (79.4%)	45 (77.6%)	0.784
Human Epidermal Growth Factor Receptor 2 (HER2) positive	16 (23.5%)	13 (22.4%)	0.865
Lymph node involvement	12 (17.6%)	18 (31.0%)	0.063

BCS: Breast-Conserving Surgery, MRM: Modified Radical Mastectomy.

Age: The average age of patients in the BCS group was 52.3 years, while it was 54.7 years in the MRM group. The difference in age was not statistically significant (p = 0.241).

Tumor Size: Patients in the MRM group had significantly larger tumors (3.2 cm) compared to the BCS group (2.1 cm), with a highly significant difference (p < 0.001).

Hormone Receptor Status: The majority of patients in both groups were hormone receptor-positive (79.4% in BCS and 77.6% in MRM), with no significant difference between the groups (p = 0.784).

HER2 Status: HER2 positivity was similar in both groups (23.5% in BCS and 22.4% in MRM), showing no significant difference (p = 0.865).

Lymph Node Involvement: The MRM group had a higher percentage of lymph node involvement (31.0%) compared to the BCS group (17.6%), though this difference approached but did not reach statistical significance (p = 0.063) [Table 2].

Local Recurrence Rate: The local recurrence rate was low in both groups, with 4.4% in the BCS group and 3.4% in the MRM group, showing no significant difference (p = 0.775).

Disease-Free Survival (DFS): DFS was high in both groups, with 95.6% in the BCS group and 94.8% in the MRM group, with no significant difference (p = 0.812).

Overall Survival (OS): OS was also similar between the groups, with 97.1% in the BCS group and 96.5% in the MRM group, showing no significant difference (p = 0.886).

Reoperation Rate: The reoperation rate was significantly higher in the BCS group (11.8%) compared to the MRM group (3.4%), with a p-value of 0.045, indicating a statistically significant difference.

Postoperative Complications: The MRM group experienced significantly more postoperative complications (24.1%) compared to the BCS group (7.4%), with a significant p-value of 0.008.

Table 2: Surgical outcomes.

Parameter	BCS group (n = 68)	MRM group (n = 58)	p-value
Local recurrence rate	3 (4.4%)	2 (3.4%)	0.775
Disease-free survival (DFS)	95.6%	94.8%	0.812
Overall survival (OS)	97.1%	96.5%	0.886
Reoperation rate	8 (11.8%)	2 (3.4%)	0.045
Postoperative complications	5 (7.4%)	14 (24.1%)	0.008

BCS: Breast-Conserving Surgery, MRM: Modified Radical Mastectomy.

Table 3: Adjuvant therapy.

Parameter	BCS group (n = 68)	MRM group (n = 58)	p-value
Radiotherapy	68 (100%)	58 (100%)	-
Chemotherapy	30 (44.1%)	32 (55.2%)	0.212
Hormonal therapy	52 (76.5%)	45 (77.6%)	0.871

BCS: Breast-Conserving Surgery, MRM: Modified Radical Mastectomy.

Table 4: Patient satisfaction.

Parameter	BCS group (n = 68)	MRM group (n = 58)	p-value
Cosmetic satisfaction	61 (89.7%)	22 (37.9%)	<0.001
Psychological impact	7 (10.3%)	22 (37.9%)	<0.001
Quality of Life (QoL) Score	8.5 ± 1.3	7.1 ± 1.7	<0.001

BCS: Breast-Conserving Surgery, MRM: Modified Radical Mastectomy.

Radiotherapy: All patients in both groups received radiotherapy (100%), with no differences between the groups.

Chemotherapy: Chemotherapy was administered to 44.1% of the BCS group and 55.2% of the MRM group, with no statistically significant difference (p = 0.212) [Table 3].

Hormonal Therapy: Hormonal therapy was used in a similar proportion of patients in both groups (76.5% in BCS and 77.6% in MRM), with no significant difference (p = 0.871).

Cosmetic Satisfaction: Cosmetic satisfaction was significantly higher in the BCS group, with 89.7% of patients reporting satisfaction compared to only 37.9% in the MRM group (p < 0.001) [Table 4].

Psychological Impact: The psychological impact was less favorable in the MRM group, with 37.9% reporting a negative impact compared to 10.3% in the BCS group, with a significant p-value of <0.001.

Quality of Life (QoL) Score: Patients in the BCS group reported a higher QoL score (8.5) compared to the MRM group (7.1), with a statistically significant difference (p < 0.001).

DISCUSSION

Comparison with Major Clinical Trials

1. NSABP B-06 Trial

The National Surgical Adjuvant Breast and Bowel Project (NSABP) B-06 trial, conducted in the 1980s, was one of the first major studies to compare BCS plus radiotherapy with MRM. The trial included 1,851 women with early-stage breast cancer and demonstrated that BCS followed by radiotherapy resulted in survival rates equivalent to those achieved with MRM.[1]

Comparison: Our study corroborates the findings of the NSABP B-06 trial, with similar DFS and OS between BCS and MRM groups. Our local recurrence rates were slightly higher in the BCS group (4.4%) compared to the B-06 trial (five-year recurrence rate of 9.7% in BCS with radiation).

2. EORTC 10801 Trial

The European Organization for Research and Treatment of Cancer (EORTC) 10801 trial included 902 patients and compared BCS with MRM. It found no significant difference in OS between the two groups, although local recurrence was higher in the BCS group (20.7 vs. 12.4%).[2]

Comparison: Our study reports a lower local recurrence rate for both BCS (4.4%) and MRM (3.4%) than the EORTC 10801 trial. This discrepancy might be attributed to advancements in surgical techniques, adjuvant therapies, and better patient selection in our contemporary cohort.

3. Milan I Trial

The Milan I trial, led by Veronesi et al., also compared BCS with MRM and concluded that BCS provided equivalent long-term survival with the advantage of breast preservation. The study reported a five-year local recurrence rate of 8.8% for BCS and 2.3% for MRM.[3]

Comparison: The Milan I trial's findings align closely with our study's results regarding survival outcomes. However, our recurrence rates were lower, likely reflecting improved radiotherapy and surgical precision over the past few decades.

4. Z0011 Trial

The Z0011 trial addressed the extent of axillary surgery in patients undergoing BCS and found that axillary dissection could be safely omitted in patients with limited sentinel node involvement, without compromising survival.[4]

Comparison: In our study, lymph node involvement was more frequent in the MRM group (31%) than in the BCS group (17.6%), yet the OS was similar. This supports the Z0011 trial's assertion that less aggressive axillary surgery in BCS patients does not adversely affect outcomes.

Outcomes part of BCS

1. Oncological Outcomes

Our study confirms the oncological safety of BCS in early-stage breast cancer, consistent with historical and contemporary trials. The comparable DFS and OS rates between BCS and

MRM suggest that BCS, combined with radiotherapy, is a valid alternative to MRM in selected patients.

The lower local recurrence rate observed in our study could be due to the application of more stringent margin assessment techniques, improved adjuvant therapies, and better imaging modalities used during patient selection and follow-up.

2. Reoperation Rates

The higher reoperation rate in the BCS group (11.8%) highlights a significant drawback of this approach, often driven by the need for margin re-excision. This finding is consistent with the literature, where positive surgical margins remain a critical concern in BCS, necessitating further surgery to achieve clear margins. With a help Frozen section facility available in hospital set up will definitely overcome this Problem.

3. Postoperative Complications

Our study found a significantly higher rate of postoperative complications in the MRM group (24.1%) compared to the BCS group (7.4%). This is consistent with the findings of the American College of Surgeons Oncology Group (ACOSOG) Z0011 trial (1) and other studies, which report higher rates of lymphedema, seroma, and wound infections in patients undergoing MRM.

The higher complication rates associated with MRM might contribute to longer recovery times and decreased patient satisfaction.

4. Patient Satisfaction and QoL

One of the most striking findings in our study is the significantly higher cosmetic satisfaction and QoL scores in the BCS group. These findings align with previous studies emphasizing the psychological and emotional benefits of breast conservation.

The impact on body image, sexual health, and overall well-being tends to be more favourable in patients undergoing BCS, as reported in quality-of-life studies such as the NSABP B-06 and the EORTC 10801 trials.

5. Limitations

The retrospective nature of our study and the relatively short follow-up period limit the generalizability of the findings. Longer follow-up is necessary to assess long-term outcomes, particularly in terms of late recurrences and OS.

Additionally, patient selection bias and the lack of randomization could influence the results. The choice of surgical procedure was based on patient and surgeon preference, which may have introduced confounding factors.

CONCLUSION

This study reinforces the role of BCS as a viable and safe alternative to MRM in the treatment of early-stage breast cancer. While both procedures offer comparable oncological outcomes, BCS provides superior cosmetic results and patient satisfaction with fewer postoperative complications. These findings are consistent with major clinical trials and underscore the importance of individualized treatment planning in early breast cancer management.

Author Contributions

Dr. Gargi N was responsible for the preparation of the article, including literature review and drafting the manuscript. Dr. Raxith Sringeri contributed significantly to the conception, design, and final revisions of the article. Dr. Vijay performed half of the surgical cases and provided clinical guidance. dr narayan i hebsur served as the Head of the Department, overseeing the project and ensuring the integrity of the work.

Ethical approval

The Institutional Review Board approval is not required since it was a retrospective study.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Conflicts of interest

Raxith Sringeri and Narayanchandra I Hebsur are on the editorial board of the Journal.

Use of Artificial Intelligence (AI)-Assisted Technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-Assisted Technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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