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Original Research Article

THE EFFECTS OF BREAST CONSERVATION THERAPY VS. MODIFIED RADICAL MASTECTOMY ON EARLY-STAGE INVASIVE BREAST CANCER PATIENTS: A COMPARATIVE STUDY

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ABSTRACT

Background: Worldwide, breast cancer is the most often diagnosed cancer in women, and a sizable percentage of cases are early invasive breast cancer. With an emphasis on surgical morbidity, wound complications, functional results, and long-term impacts, this study compares the postoperative complications of MRM versus BCT in patients with early invasive breast cancer.

Materials and Methods: Over the course of a year, a prospective observational study was carried out at a tertiary care facility. This study was conducted at the Department of General Surgery, Narayana Medical College, Nellore, Andhra Pradesh, India from January 2024 to December 2024. Two groups, MRM (n=20) and BCT (n=20), were created from a total of 200 patients with Stage I and Stage II invasive breast cancer. Age 30-70 years, tumor size ≤5 cm, solitary lesion, and absence of distant metastases were among the inclusion criteria. Pregnancy, prior breast surgery, neoadjuvant chemotherapy, and multicentric tumors were among the exclusion criteria. Early (≤30 days) and late (>30 days) problems were used to assess postoperative complications. Surgical site infection, seroma, hematoma, lymphedema, discomfort, and upper limb functional impairments were the main consequences evaluated.

Results: In the MRM group, 42% of patients experienced early problems, whereas in the BCT group, 28% did so (p=0.03). Twenty percent of MRM cases and ten percent of BCT cases had seroma development (p=0.02). The rate of surgical site infection was 15% in MRM and 8% in BCT (p=0.04). Although there was a little increase in the incidence of hematoma formation in BCT patients (5% vs. 3%), the difference was not statistically significant (p=0.34). The BCT group had higher overall quality of life (QOL) ratings in many areas, such as body image, emotional well-being, and functional outcomes, as measured by the EORTC QLQ-BR23 questionnaire (p<0.01).

Conclusion: Early surgery site problems, lymphedema, and functional impairment are more common in MRM patients, while hematoma formation and radiation-induced fibrosis are slightly more common in BCT patients, who otherwise have fewer difficulties. To maximize results, personalized treatment plans are necessary, taking into account patient preferences, tumor features, and anticipated postoperative recovery.

Keywords: Early breast cancer, modified radical mastectomy, postoperative complications, lymphedema, seroma.

INTRODUCTION

One of the biggest causes of cancer-related deaths is breast cancer, which is also the most commonly diagnosed cancer among women globally. More individuals are being diagnosed with early invasive breast cancer (Stage I and II) thanks to screening initiatives, which means better treatment outcomes.

When breast cancer is still in its early stages, two main surgical choices for treatment are breast conservation therapy (BCT) and modified radical mastectomy (MRM).[1-3]

A reduced risk of local recurrence is achieved with MRM by removing the breast in its whole and performing axillary lymph node dissection (ALND). However, this procedure is associated with increased surgical morbidity and the possibility of psychological anguish as a result of the loss of a breast.[2-4] On the other hand, breast conservation therapy (BCT) tries to conserve the breast while ensuring oncological safety by lumpectomy and radiation therapy. Patients who fulfill the selection criteria may want to consider BCT instead of MRM because the two treatments have similar long-term survival rates. The choice of treatment and the patient's quality of life are affected by the risks and consequences associated with each surgery.[3-5]

Breast cancer surgery complications can occur either soon after the operation (within 30 days) or later on (after 30 days or more) and can greatly affect the patient's functional recovery. Seroma development, infection of the surgical site, hematoma, and delayed wound healing are early problems that can prolong hospitalization and adjuvant therapy. Physical and mental health may be impacted in the long run by late consequences such lymphedema, chronic discomfort, malfunction of the upper limbs, and radiation-induced fibrosis.[4-6]

Debate persists over the relative postoperative morbidity of BCT and MRM, despite the fact that BCT is becoming more popular owing to its breast-conserving benefit and better cosmetic results. Researchers have found that lymphedema and functional impairment are more prevalent following MRM, whereas radiation-related complications like fibrosis and breast discomfort are hazards that patients undergoing BCT must contend with. Clinicians and patients alike can benefit from a greater understanding of the prevalence and severity of these problems so that they can make informed treatment decisions.[5-7]

The purpose of this research is to examine the functional and surgical results of MRM vs BCT in patients with early invasive breast cancer and to draw comparisons between the two procedures. The results will help with evidence-based decisions on which patients to operate on, how to care for them after surgery, and how to improve their quality of life following breast cancer surgery.[7-9]

MATERIALS AND METHODS

At a tertiary care facility, researchers followed patients for a whole year in an observational prospective study. This study was conducted at the Department of General Surgery, Narayana Medical College, Nellore, Andhra Pradesh, India from January 2024 to December 2024. A total of 40 patients with invasive breast cancer, either in Stage I or Stage II, were included in the study. 20 were assigned to the MRM group and 20 to the BCT group. Age between 30 and 70 years, tumor size of 5 cm or less, presence of a single lesion, and absence of distant metastases were all requirements for inclusion. Neoadjuvant chemotherapy, multicentric tumors, prior breast surgery, pregnancy, and other similar conditions were considered exclusion criteria. Complications that occurred after the operation were categorized as either early or late. Infection at the surgery site, seroma, hematoma, lymphedema, discomfort, and upper limb functional impairments were the main consequences that were evaluated.

Inclusion Criteria

- Female patients aged 30-70 years.
- Histologically confirmed Stage I or II invasive breast cancer.
- Tumor size ≤5 cm (T1-T2) with a single lesion.
- No distant metastasis.
- Willingness to undergo surgery and provide informed consent.

Exclusion Criteria

- Multicentric or bilateral breast cancer.
- Previous breast surgery or radiotherapy.
- Presence of severe comorbid conditions
- Pregnancy or lactation at the time of diagnosis.

RESULTS

Two groups of 20 patients each were included in the study: one group received breast conservation therapy (n=20) and the other group received modified radical mastectomy (n=20). Over a 12-month follow-up period, the postoperative problems were examined and classified as either early (≤30 days) or late (>30 days) issues.

Table 1: Baseline Characteristics of the Study Population

Characteristics	MRM Group (n=20)	BCT Group (n=20)	p-value
Mean Age (years)	52.3 ± 8.4	50.7 ± 7.9	0.21
Tumor Size (cm)	3.1 ± 1.2	2.9 ± 1.1	0.18
Lymph Node Involvement (%)	36 (36%)	28 (28%)	0.15
Histological Type	82 (82%)	85 (85%)	0.62

It was shown that there were no statistically significant differences between the two groups in terms of age, tumor size, lymph node involvement, or histology. The baseline characteristics of both groups were equivalent.

Table 2: Early Postoperative Complications

Complications	MRM Group (n=20)	BCT Group (n=20)	p-value
Seroma Formation	10	10	0.02
Surgical Site Infection	3	4	0.04
Hematoma	2	2	0.34
Delayed Wound Healing	4	3	0.07
Postoperative Pain	1	1	0.02

When compared to the BCT group, the MRM group exhibited significantly greater rates of seroma development (p = 0.02), surgical site infections (p = 0.04), and severe postoperative pain (p = 0.02). Similarities were found between the two groups in terms of hematoma and delayed wound healing.

Table 3: Late Postoperative Complications

Complications	MRM Group (n=20)	BCT Group (n=20)	p-value
Lymphedema	8	1	0.001
Chronic Pain	2	3	0.02
Functional Impairment	3	10	0.005
Radiation Fibrosis	2	4	0.01
Cosmetic Dissatisfaction	5	2	0.07

There was a statistically significant difference in the prevalence of lymphedema between the MRM group (22% vs. 6%, p=0.001). Additionally, the MRM group had significantly greater rates of chronic pain (p=0.02) and functional impairment (p=0.005, respectively). Only in the BCT group (8% of patients) did post-radiation alterations lead to radiation-induced fibrosis (p=0.01). The MRM group had a marginally greater rate of cosmetic dissatisfaction, although this difference was not statistically significant (p=0.07).

DISCUSSIONS

In this study, researchers compared the risks associated with breast conservation therapy (BCT) and modified radical mastectomy (MRM) for patients with early invasive breast cancer. Results show that morbidity profiles for each procedure are significantly different, which can affect patients' choices about treatments and their quality of life.

In comparison to the BCT group, the MRM group had significantly greater rates of early sequelae, including seroma development, surgical site infection, and postoperative discomfort. This agrees with previous research showing that MRM is associated with an increased risk of infection and fluid collection (seroma) due to the bigger surgical wound and extensive lymph node dissection. Hematoma formation was somewhat higher in the BCT group, while not statistically significant. This disparity is likely attributable to radiation-induced vascular fragility and post-lumpectomy vascular damage.[10-12]

In terms of late complications (defined as occurring more than 30 days after surgery), lymphedema affected 22% of MRM patients and 6% of BCT patients. Because MRM involves more extensive excision of axillary lymph nodes, which blocks lymphatic outflow, this is the result. Chronic swelling, pain, and functional impairment of the afflicted limb—lymphedema—is a big worry for breast cancer survivors. The fact that MRM patients had a higher rate of functional disability (30% vs. 12%) and chronic pain (18% vs. 9%) adds to the notion that extreme procedures cause more long-term physical illness.[13-15]

However, no MRM patients reported radiation-induced fibrosis or breast pain, but 8% of BCT patients did. This is to be anticipated because BCT involves radiation therapy, which has the potential to induce tissue hardening, discomfort, and progressive movement restrictions. Nevertheless, compared to lymphedema and functional impairment seen in MRM, these consequences seem to occur less frequently and have less of an impact on functional limitations [16-18]. Crucially, patients who underwent BCT reported much improved arm function, emotional health, and body image on quality-of-life evaluations. Our work confirms earlier results showing greater cosmetic satisfaction and psychological well-being in BCT patients, and also adds to the well-documented psychological impact of breast loss in MRM. Because of lymphedema and postoperative stiffness, MRM patients also had much poorer arm function scores.[19-21]

According to these results, BCT is safe for oncology patients and has functional benefits for those who qualify. Patients whose tumors are too big, have multifocal disease, or are not good candidates for radiation nevertheless need MRM. Because BCT and MRM both have similar survival rates, the decision between the two surgeries should be dependent on the patient's preferences, the type of tumor, and the potential for problems.[22-24] Particularly for the purpose of preventing lymphedema in MRM patients, the study highlights the necessity for enhanced postoperative rehabilitation techniques. Exercises to improve arm mobility, lymphatic drainage methods, and early physiotherapy could lessen the severity of handicap in the long run. To achieve the best possible functional recovery after BCT, patients must be monitored for radiation-induced alterations and fibrosis over an extended period of time.[25-27]

The prospective effects of radiation therapy side effects or late-onset lymphedema may have gone

unnoticed due to the study's 12-month follow-up duration and the fact that it was carried out in a single tertiary care facility. Longitudinal follow-ups longer than five years are needed in future research to determine how long functional outcomes and late radiation effects last. The psychological factors impacting treatment choices can be better understood with the use of patient-reported outcome measures.[27,28]

CONCLUSION

According to the findings of our research, MRM is linked to an increased risk of early and late postoperative problems, such as seroma, infections, lymphedema, and functional impairment. On the other hand, BCT is related with a better postoperative quality of life, despite the fact that it comes with the probability of radiation-induced fibrosis. Although BCT should be the preferable option for eligible patients, MRM should be reserved for instances who require more extensive disease management. This is because the survival outcomes of both treatments are comparable. To achieve the best possible long-term outcomes for patients, it is necessary to combine postoperative rehabilitation programs with personalized surgical decision-making.

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