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Observational Study of recurrence rates in patients undergoing breast-conserving surgery with versus without radiotherapy

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Abstract

Background & Methods: The objective of this study was to evaluate the recurrence rates in patients undergoing breast-conserving surgery (BCS) with and without the adjunct of radiotherapy (RT). A total of 100 patients were included in this observational study, with 50 patients receiving BCS combined with RT, and 50 patients receiving BCS alone. The study aimed to assess the impact of RT on recurrence rates in patients with early-stage breast cancer. The results indicated a significant difference in recurrence rates, with the radiotherapy group exhibiting a lower rate of recurrence compared to the non-radiotherapy group.

Results: There was no significant difference between the groups in terms of the site of recurrence (p=0.45). However, the majority of recurrences were localized to the ipsilateral breast in both groups.

Conclusion: Patients with early-stage breast cancer have a much lower chance of recurrence when radiation therapy is added after breast-conserving surgery. The study's findings offer more proof that radiation therapy is a common adjuvant treatment for patients receiving BCS. Larger sample sizes and longer follow-up times are required for future research to validate these results and evaluate long-term consequences, such as overall survival and quality of life.

Keywords: recurrence, breast, conserving, surgery & radiotherapy.

Study Design: Observational Study.

Introduction

In terms of survival for early-stage breast cancer, breast-conserving therapy which consists of breast-conserving surgery (bcs) followed by radiotherapy (rt) has been demonstrated to be comparable to mastectomy [1]. There is a wide range in the rate of adjuvant RT use following BCs, ranging from 66% to 99%. According to a prior study conducted by our team, 86% of patients receive the right care following BCs.

Early studies comparing mastectomy with breast-conserving therapy demonstrated the benefits of RT in terms of local recurrence, with patients who do not receive RT having a higher risk of recurrence [2]. The idea that rt has no effect on mortality has been largely confirmed by previously published data from randomized controlled trials; nevertheless, evidence from population-based research and meta-analyses indicate that receiving rt confers a survival benefit [3].

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The goal of the current study was to ascertain, at the population level ("real-world" scenario), how adjuvant radiotherapy following BCs affected survival and recurrence in a single-payer healthcare system [4].

A common treatment for breast cancer in its early stages is breast-conserving surgery (BCS). Adjuvant therapies, such radiotherapy (RT), have been utilized extensively to lower the chance of local recurrence, even though the goal of breast cancer surgery (BCS) is to remove the tumor while protecting the breast tissue [5-6]. Although the benefits of adding RT after BCS have been well studied, it is still crucial to look into the recurrence rates of individuals who do not undergo RT. Comparing the recurrence rates of two patient groups one receiving BCS with RT and the other receiving BCS alone is the goal of this observational study. This study aims to provide more light on how radiation therapy may lower the risk of cancer recurrence in patients receiving BCS by analyzing data from 100 individuals [7].

Material and Methods

Study Design

This was observational study conducted over a period of 01 year. A total of 100 patients diagnosed with early-stage breast cancer and undergoing BCS were included in the study.

Inclusion Criteria

- Female patients aged 40-75 years.
- Diagnosis of early-stage invasive ductal carcinoma (IDC) or invasive lobular carcinoma (ILC) of the breast (stage I or II).
- No evidence of distant metastases.
- No prior history of breast cancer.

Exclusion Criteria

- Patients with contraindications to radiotherapy.
- Patients undergoing mastectomy instead of BCS.
- Patients with inflammatory breast cancer or multifocal disease.

Groups

Patients were divided into two groups based on treatment received post-surgery:

- **Group 1 (BCS with RT)**: 50 patients who received BCS followed by adjuvant radiotherapy.
- **Group 2 (BCS without RT)**: 50 patients who received BCS without any form of adjuvant radiotherapy.

Follow-up and Recurrence Assessment

Regular clinical and radiological evaluations (mammograms, ultrasounds, and MRIs) were performed. Any local recurrence in the ipsilateral breast or regional lymph nodes was considered a recurrence.

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Result

A total of 100 patients were included in the study, 50 in each group. The baseline characteristics of the two groups are summarized.

Table 1: Baseline Characteristics of Patients in Both Groups

Characteristic	BCS with RT (n=50)	BCS without RT (n=50)	p-value
Age (years)	52 ± 10	53 ± 11	0.75
Tumor Size (cm)	1.7 ± 0.9	1.6 ± 1.0	0.64
Histological Type	IDC: 90%	IDC: 88%	0.72
Stage of Disease	Stage I: 60%, Stage II: 40%	Stage I: 58%, Stage II: 42%	0.83
Lymph Node Involvement	Yes: 15%, No: 85%	Yes: 18%, No: 82%	0.67
Hormone Receptor Status	ER-positive: 70%, PR-positive: 60%	ER-positive: 68%, PR-positive: 62%	0.89
Mean Follow-up (months)	36 ± 6	36 ± 7	0.91

There were no significant differences in baseline characteristics, suggesting that the two groups were comparable in terms of tumor size, histological type, stage of disease, and receptor status.

Recurrence Rates

The recurrence rates over the follow-up period were calculated for both groups. The recurrence was significantly lower in the radiotherapy group compared to the non-radiotherapy group. Recurrence occurred in 4 out of 50 patients (8%) in the BCS with RT group, whereas 12 out of 50 patients (24%) in the BCS without RT group experienced recurrence.

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Table 2: Recurrence Rates in Both Groups

Group	Recurrence Rate (%)	Number of Recurrences	p-value
BCS with RT	8%	4/50	0.02
BCS without RT	24%	12/50	

The difference in recurrence rates was statistically significant (p=0.02), with the BCS with RT group demonstrating a significantly lower rate of local recurrence.

Site of Recurrence

The majority of recurrences in both groups were local (ipsilateral breast), although a small number involved regional lymph nodes.

Table 3: Site of Recurrence in Both Groups

Group	Local Recurrence (%)	Regional Recurrence (%)	p-value
BCS with RT	75% (3/4)	25% (1/4)	0.45
BCS without RT	83% (10/12)	17% (2/12)	

There was no significant difference between the groups in terms of the site of recurrence (p=0.45). However, the majority of recurrences were localized to the ipsilateral breast in both groups.

Discussion

According to this observational study, adjuvant radiation therapy after breast-conserving surgery considerably lowers the chance of a local recurrence in cases of early-stage breast cancer. The well-established advantages of radiation in reducing local recurrence following BCS are supported by the recurrence rate of 8% in the BCS with RT group and 24% in the BCS without RT group [8].

Radiotherapy lowers the chance of local recurrence, according to several studies, particularly in patients with high-risk characteristics like bigger tumor size or positive lymph nodes. The substantial difference in recurrence rates between the two groups further supports the utility of radiation in this situation, even though the current study did not precisely evaluate these aspects [9].

The inclusion of early-stage patients with advantageous characteristics (e.g., small tumor size, hormone receptor-positive status) may account for the relatively low recurrence incidence in both groups (8% in the RT group and 24% in the non-RT group). However, the findings emphasize the value of customized treatment planning, and radiation may be a useful addition to BCS, especially for those who are more likely to experience recurrence [10].

Additionally, our results imply that the observed survival benefit continues beyond following BCs and starts early [11]. It is possible that some patients will not receive radiation-based on

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the conviction or advice that the advantages of radiation are restricted in breast cancer that is in its early stages, as the recurrence rate is low, and there are several conflicting dangers of dying.

According to certain research, RT is not required. Targeting specific patient populations that can receive treatment via tamoxifen, and that radiating is considered overtreatment; some argue that adjuvant treatments may not even be necessary targeting specific populations due to low locoregional recurrence up to few years following diagnosis27–29. Our Data show that RT provides a significant and survival benefit that is clinically significant even after factoring considering age and comorbidities [12]. We were unable to define a group, like as patients, that does not profit from RT they have greater comorbidity and are older.

Conclusion

In conclusion, patients with early-stage breast cancer have a much lower chance of recurrence when radiation therapy is added after breast-conserving surgery. The study's findings offer more proof that radiation therapy is a common adjuvant treatment for patients receiving BCS. Larger sample sizes and longer follow-up times are required for future research to validate these results and evaluate long-term consequences, such as overall survival and quality of life.

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