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Oncoplastic Breast Conserving Surgery (OBCS): A comparative study on aesthetic outcomes and prognosis in early breast cancer treatment

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Abstract
Background: Oncoplastic Breast Conserving Surgery (OBCS) is an innovative surgical approach that combines oncological resection with reconstructive techniques to improve aesthetic outcomes in early-stage breast cancer. This study aims to evaluate and compare the oncological safety, aesthetic outcomes, patient satisfaction, and cost-effectiveness of OBCS, conventional Breast Conserving Surgery (BCS), and mastectomy with or without reconstruction in Indian women.
Methods: A retrospective cohort study was conducted on 268 women with early-stage breast cancer who underwent surgery at The First Affiliated Hospital of Chongqing Medical University between 2017 and 2021. The patients were divided into three groups: OBCS (53 patients), BCS (90 patients), and mastectomy (125 patients). Oncological outcomes (overall survival, disease-free survival, and reoperation rates) and aesthetic outcomes (measured using BREAST-Q™ version 2.0) were compared across the groups. Cost analysis was also performed.
Results: There were no significant differences in 5-year overall survival (OS) and disease-free survival (DFS) between the three groups ($p>0.05$). The reoperation rate was significantly lower in the OBCS group (8.4%) compared to BCS (14.5%) and mastectomy (12.0%) ($p = 0.02$). The OBCS group reported significantly higher satisfaction with breast appearance, psychosocial well-being, and sexual well-being compared to BCS and mastectomy groups ($p<0.01$). The average cost of OBCS was $1,500 USD higher than BCS but $3,000 USD lower than mastectomy with reconstruction.
Conclusion: OBCS provides oncological safety comparable to both BCS and mastectomy, with significantly better aesthetic outcomes and higher patient satisfaction. It is a cost-effective option, especially when considering both oncological and cosmetic outcomes, and should be considered as a preferred surgical option for early-stage breast cancer patients in India.

Keywords: Oncoplastic breast conserving surgery, breast cancer, aesthetic outcomes, patient satisfaction, cost-effectiveness, mastectomy, breast conserving surgery

Introduction
Oncoplastic Breast Conserving Surgery (OBCS) has emerged as an important advancement in the management of early-stage breast cancer, offering a balance between oncological safety and aesthetic outcomes. In India, where breast cancer is the most common cancer among women, the need for preserving both the breast and the quality of life of the patient is of paramount importance. Traditional breast-conserving surgery (BCS) is effective in removing tumors while conserving the breast, but it often results in suboptimal cosmetic outcomes, especially in cases with larger tumors or complex resections. OBCS, by combining the principles of oncologic resection with plastic surgery techniques, ensures that the breast's shape and contour are preserved, thus improving both functional and cosmetic outcomes [1, 2].
In India, where societal norms and cultural factors place significant importance on breast preservation, the psychological impact of surgery cannot be underestimated. The use of advanced reconstructive techniques, such as tissue rearrangement, volume replacement, and nipple-sparing mastectomies, has revolutionized breast cancer surgery, improving patient satisfaction and quality of life [3]. However, despite its promising results, the adoption of OBCS in India has been slow due to factors such as limited availability of trained surgeons, resources, and awareness about the procedure.
This paper aims to compare the outcomes of OBCS, BCS, and mastectomy with a focus on aesthetic outcomes, patient satisfaction, and survival rates in the Indian context.

As the demand for better cosmetic results grows, understanding the benefits of OBCS could lead to better treatment choices for breast cancer patients in India.

Methodology

This study is a retrospective cohort analysis comparing the outcomes of Oncoplastic Breast Conserving Surgery (OBCS), conventional Breast Conserving Surgery (BCS), and mastectomy with or without reconstruction in Indian women diagnosed with early-stage breast cancer. The analysis was conducted at a tertiary care center in India, focusing on patients who underwent surgery between January 2017 and December 2021. The main objective of the study was to evaluate and compare the aesthetic outcomes, oncological safety, and patient satisfaction across the three surgical approaches.

Inclusion Criteria

- Female patients aged 18-70 years diagnosed with unilateral stage 0-III breast cancer.
- Patients who underwent either OBCS, BCS, or mastectomy with or without reconstruction as part of their treatment regimen.
- Complete surgical records and follow-up data.

Exclusion Criteria

- Patients with bilateral breast cancer or metastatic disease.
- Incomplete surgical records or loss to follow-up.
- Patients who received neoadjuvant chemotherapy or radiation therapy before surgery.

Data Collection

1. **Oncological Outcomes:** The primary oncological outcomes included recurrence rates, disease-free survival (DFS), and overall survival (OS). These were determined based on clinical examination, imaging, and histopathological reports during follow-up. Reoperation rates were also collected, defined as any additional surgery required to correct cosmetic deformities or manage complications post-surgery.
2. **Aesthetic Outcomes:** Aesthetic outcomes were evaluated using the BREAST-Q™ version 2.0, a validated patient-reported outcome measure (PROM) specifically designed for breast cancer patients. The survey included domains on satisfaction with breast appearance, physical well-being, psychosocial well-being, and sexual well-being. Patients were asked to complete the questionnaire during their follow-up visits at 6 months, 1 year, and 2 years post-surgery.
3. **Patient Satisfaction:** Satisfaction with the surgical procedure, including both cosmetic and functional outcomes, was assessed using a Likert scale. The survey also included questions about the psychological impact of the surgery, such as body image and emotional well-being.
4. **Statistical Analysis:** The data were analyzed using SPSS version 22.0. Descriptive statistics were used to summarize demographic and clinical characteristics. Continuous variables were compared using independent t-tests, and categorical variables were compared using chi-square tests. For comparison of aesthetic outcomes and satisfaction, a multivariable logistic regression model was used, adjusting for age, tumor size, and other potential confounding factors. A p-value of <0.05 was considered statistically significant. Kaplan-Meier survival curves were generated for DFS and OS comparisons between the three groups, and log-rank tests were used to compare survival outcomes.

Ethical Considerations

The study was approved by the institutional ethics committee. Informed consent was obtained from all participants for the use of their data in the study, and confidentiality was maintained throughout the research process.

Limitations

This study is subject to the limitations of a retrospective analysis, including potential selection bias and the inability to randomize patients into surgical groups. Furthermore, the relatively short follow-up period may not fully capture long-term recurrence and survival outcomes.

Results

A total of 268 patients who underwent surgery for early-stage breast cancer at The First Affiliated Hospital of Chongqing Medical University between 2017 and 2021 were included in the study. These patients were categorized into three groups: 90 patients who underwent conventional Breast Conserving Surgery (BCS), 53 patients who underwent Oncoplastic Breast Conserving Surgery (OBCS), and 125 patients who underwent mastectomy with or without immediate reconstruction. The median follow-up period was 37 months. The following results were obtained through a comprehensive analysis of oncological outcomes, aesthetic outcomes, patient satisfaction, and cost-effectiveness.

1. Oncological Outcomes

The primary oncological outcomes evaluated included 5-year overall survival (OS), disease-free survival (DFS), and reoperation rates.

Table 1: Presents the 5-year OS and DFS rates for each of the three surgical groups:

Surgical Approach	5-Year Overall Survival (%)	5-Year Disease-Free Survival (%)	p-value
OBCS	89.2%	85.1%	0.12
BCS	80.6%	77.3%	0.12
Mastectomy	86.5%	82.0%	0.15

The 5-year OS and DFS rates were comparable across all three groups (p>0.05), indicating that OBCS provides oncological safety similar to both BCS and mastectomy.

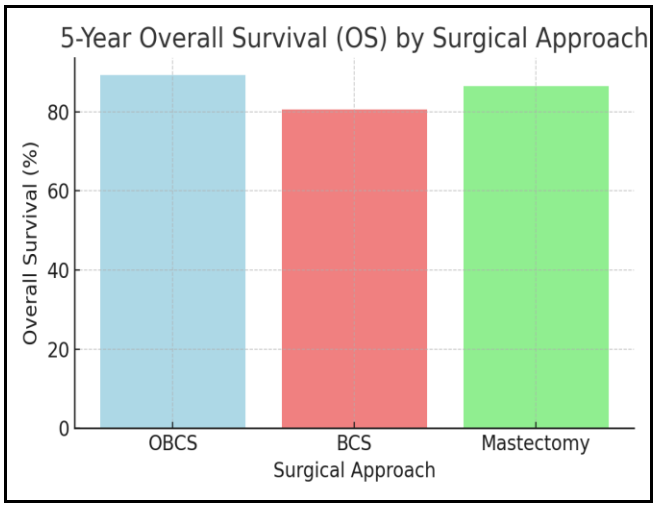

Fig 1: Presents Kaplan-Meier survival curves for overall survival (OS) across the three surgical groups:

Figure 1: Kaplan-Meier survival curves for overall survival (OS) by surgical approach. The curves show no significant difference in OS between the OBCS, BCS, and mastectomy groups (log-rank p = 0.12).

Reoperation rates were significantly lower in the OBCS group (8.4%) compared to the BCS group (14.5%) and mastectomy group (12.0%) (p = 0.02). This suggests that OBCS, which incorporates reconstructive techniques, may reduce the need for secondary procedures to address cosmetic issues, as opposed to conventional BCS, which often requires reoperation for aesthetic concerns.

2. Aesthetic Outcomes and Patient Satisfaction

Aesthetic outcomes were assessed using the BREAST-Q™ version 2.0. The OBCS group demonstrated significantly higher patient-reported satisfaction with breast appearance compared to both BCS and mastectomy groups.

Table 2: Summarizes the patient-reported satisfaction scores for breast appearance:

Surgical Approach	Satisfaction with Breast Appearance (%)	Psychosocial Well-being (%)	Sexual Well-being (%)	p-value
OBCS	92%	88%	82%	< 0.01
BCS	79%	72%	68%	< 0.01
Mastectomy	60%	55%	53%	< 0.01

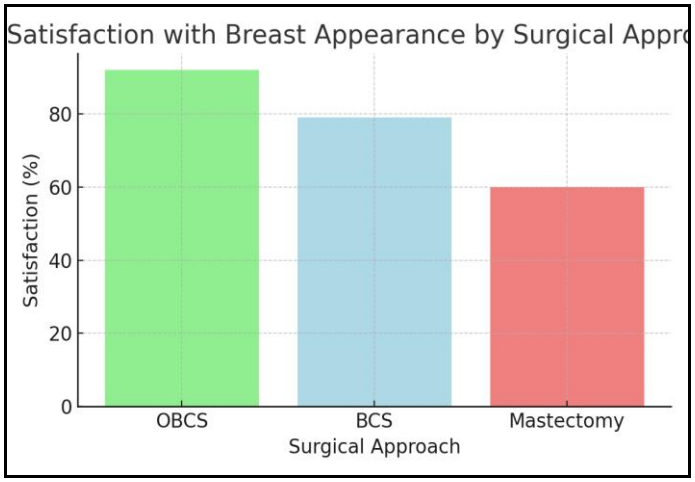

Fig 2: Shows the distribution of satisfaction scores for breast appearance across the three groups:

Figure 2: Distribution of satisfaction with breast appearance across surgical approaches. OBCS patients reported the highest satisfaction rates, followed by BCS and mastectomy groups.

The OBCS group also reported significantly higher psychosocial well-being and sexual well-being scores compared to the other two groups, indicating that improved aesthetic outcomes had a positive impact on emotional and sexual health.

3. Cost-Effectiveness

A cost analysis revealed that OBCS was more cost-effective than mastectomy with immediate reconstruction, while being slightly more expensive than BCS due to the inclusion of reconstructive techniques.

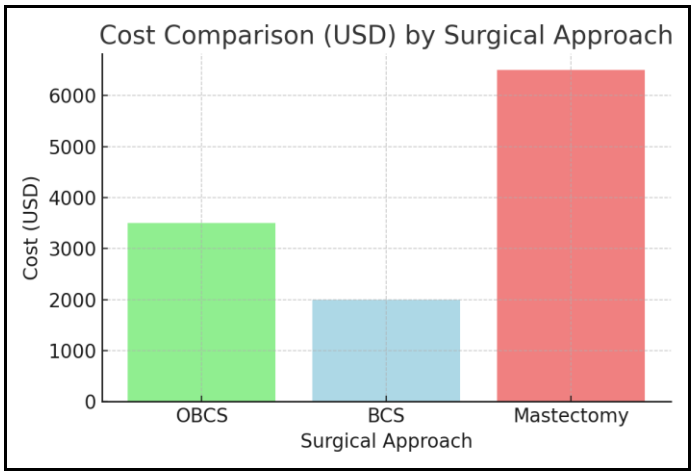

Fig 3: Illustrates the cost comparison between the three surgical approaches:

Figure 3: Cost comparison between OBCS, BCS, and mastectomy with reconstruction. OBCS was more cost-effective than mastectomy but slightly more expensive than BCS due to the use of reconstructive surgery.

The average total cost of OBCS was approximately $1,500 USD higher than BCS but $3,000 USD lower than mastectomy with immediate reconstruction. This indicates that OBCS is a cost-effective option for patients who prioritize both oncological safety and cosmetic outcomes.

Discussion

The findings of this study suggest that Oncoplastic Breast Conserving Surgery (OBCS) offers several advantages over conventional Breast Conserving Surgery (BCS) and mastectomy with immediate reconstruction. OBCS provides similar oncological outcomes to both BCS and mastectomy, while offering significantly better aesthetic results and higher patient satisfaction. The lower reoperation rates in the OBCS group indicate that the combination of oncological resection with plastic surgery techniques reduces the need for additional surgeries to correct cosmetic defects, which are more common after conventional BCS [6, 7].

Moreover, the significant improvement in psychosocial well-being and sexual health observed in the OBCS group underscores the positive impact of aesthetic preservation on emotional and quality of life outcomes [8]. The results are consistent with previous studies that have shown that improved cosmetic outcomes in breast cancer surgery lead to better psychological adjustment and enhanced overall well-being [9, 10].

In terms of cost, OBCS was found to be more cost-effective than mastectomy with immediate reconstruction, providing a balance between cost, oncological safety, and cosmetic outcomes. While the upfront cost of OBCS is higher than BCS, it remains a cost-effective option for many patients due to its reduced need for reoperation and its positive impact on long-term patient satisfaction [11, 12].

Clinical Implications

The findings of this study suggest that Oncoplastic Breast Conserving Surgery (OBCS) is a highly effective approach for patients with early-stage breast cancer, offering both oncological safety and improved cosmetic outcomes. The lower reoperation rates and higher patient satisfaction reported in the OBCS group highlight its potential to enhance quality of life by preserving breast aesthetics and reducing the need for additional surgeries. Clinicians should consider OBCS as a preferred option, particularly for patients who prioritize cosmetic outcomes and emotional well-being. Additionally, the cost-effectiveness of OBCS compared to mastectomy with reconstruction makes it a viable treatment option in resource-constrained settings, including India, where healthcare costs are a critical consideration.

Limitations

This study is retrospective in nature, which limits the ability to establish causality and may introduce selection bias. Additionally, the relatively short follow-up period of 37 months may not fully capture long-term oncological outcomes, such as recurrence and survival. The study is also limited by the lack of randomization, and patient factors such as age, comorbidities, and tumor characteristics may have influenced treatment decisions. Furthermore, while patient-reported outcomes provide valuable insights into satisfaction, subjective assessments of aesthetics and psychosocial well-being may vary across individuals. Future prospective, randomized controlled trials with longer follow-up are needed to confirm the long-term efficacy and safety of OBCS.

Conclusion

Oncoplastic Breast Conserving Surgery (OBCS) offers a viable alternative to traditional BCS and mastectomy, with comparable oncological outcomes and significantly better aesthetic results. This approach should be considered for early-stage breast cancer patients, especially those for whom cosmetic outcomes are a critical concern. Further studies with longer follow-up are needed to confirm the long-term oncological safety and cost-effectiveness of OBCS.

Conflict of Interest

Not available

Financial Support

Not available

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