

Partial Breast Reconstruction and Oncoplasty: Our Experience

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ABSTRACT

Objective: To evaluate outcomes of partial breast reconstruction and oncoplastic procedure in a tertiary care setup.

Study Design: Prospective observational study.

Place and Duration of Study: Combined Military Hospital Rawalpindi, Pakistan from Jan 2023 to Jun 2024.

Methodology: In this study, 46 patients were included who had benign or malignant breast tumor with high tumor to breast ratio, requiring surgical excision when adequate downsizing was not achieved or was not possible with primary systemic therapy, were offered breast oncoplastic surgery. Each case underwent Triple Assessment and discussed in Multi-Disciplinary Meeting. All cases were staged using American Joint Committee on Cancer (AJCC) staging system. Clinically T4 and metastatic disease patients were excluded. Patients were followed for post operative complications including bleeding, infection, flap necrosis, seroma formation, fat necrosis, length of hospital stay and recurrence, and evaluated for aesthetic outcomes.

Results: This study included total of 46 patients with a mean age of 47 years. Majority of patients had clinical T2 tumor and stage 2 disease. Most patients were luminal A type or DCIS, and upfront surgery was performed. Early post operative complications include bleeding and hematoma formation in 4.3% of patients, wound infection in 9.3 %, 4.3% had wound dehiscence. Mean hospital stay was 3 days, and none required re-admission for any complication encountered.

Conclusion: Oncoplastic breast surgery, despite its associated early postoperative complications, achieves good aesthetic outcomes and is oncologically safe across all age group and surgical setting.

Keywords: Breast Neoplasm, Breast Surgery, Oncoplastic breast surgery, Partial Breast Reconstruction, Treatment Outcome

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INTRODUCTION

Breast Cancer is one of leading cause of cancer associated death in women worldwide and likewise, is one of commonest cancer in Pakistani women.¹ Breast cancer has heterogeneity, making four molecular subtypes are based on estrogen receptor status of estrogen and progesterone receptor and HER2 over expression. Subtypes includes luminal A, luminal B, triple-negative breast cancer (TNBC) and HER2 enriched cancer.² Management of breast cancer requires case discussion in Multidisciplinary meeting(MDM) that include breast surgeon, medical and radiation oncologists, radiologist and histopathologist. Common management steps in patients undergoing treatment with curative intent include surgery, radiotherapy, chemotherapy and personalized strategies like endocrine and anti-HER2 therapies.³

Breast cancer treatment has evolved over time, both in surgical and medical approach. The primary

aim of surgical intervention is to attain local control, along with assessment of exact pathological stage in upfront cases, whereas in post chemo patients it provides clear prediction of pathological response to primary systemic therapy. Surgical option for treating breast cancer includes mastectomy with or without reconstruction (immediate or delayed as 2 stage procedure, or breast conserving therapy (BCT) incorporating oncoplastic procedures. The use of sentinel node biopsy is standard of care in cN0 patients, and level II axillary dissection being done in locally advanced breast tumors having significant metastasis in axilla.⁴

Traditionally, conventional breast-conserving surgery (BCS) aims to remove breast cancer while preserving as much of breast as possible, but it can be challenging for women with large tumors relative to their breast size, sometimes leading to an undesirable mastectomy. Synchronous plastic and oncological surgery are performed to ensure clear excision margins while achieving high-quality aesthetic results, particularly in cases where conventional breast-conserving approach is expected to yield a poor

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cosmetic outcome or is not feasible without compromising oncological safety.⁵

Oncoplastic breast-conserving surgery (O-BCS) combines cancer removal with plastic surgery techniques to achieve better cosmetic outcome.⁽⁶⁾ O-BCS should be offered to all newly diagnosed breast cancer patients.⁽⁷⁾ O-BCS involves either reshaping the remaining breast tissue (volume displacement) or using tissue from other areas of the body (volume replacement) to fill the defect after tumor removal. Oncoplastic breast surgery comprises mammoplasty, partial and total breast reconstruction. If particular procedures are inaccessible in locality, referral pathways should be arranged to ensure timely access to appropriate care.^{6,7} This approach often results in higher patient satisfaction and improved quality of life.⁶

Volume displacement techniques can include various techniques, for example: wise pattern therapeutic mammoplasty; vertical scar mammoplasty (and its variations); circumareolar/round block mammoplasty; lateral mammoplasty/racquet handle. Similarly, there are many techniques for autologous partial volume replacement techniques. The following techniques are recognized as partial volume replacement techniques, where the differentiating factor between which flap is used is usually the location of the tumor. Local flaps can be used to correct defects in lower part of breast include anterior intercostal artery perforator flap, superior epigastric artery perforator flap, medial intercostal and internal mammary artery perforator. Defects in the lateral portion of breast can be reconstructed using perforator flaps from lateral chest wall, such as lateral intercostal artery perforator (LICAP); lateral thoracic and thoracodorsal artery perforator flaps.^{6,8,9} Defects in any breast quadrant can be dealt with distant flaps. Most often pedicled flaps are used, but free flaps like mini-latissimus dorsi, omental flaps; transverse upper gracilis flap can be utilized for breast reconstruction.^{4,10}

METHODOLOGY

This prospective observational study was conducted at CMH Rawalpindi, Pakistan after obtaining ethical approval from Ethical Committee/Institutional Review Board, CMH Rawalpindi. (Vide reference Ser no. 573 dated 01/08/2023).

Inclusion Criteria: The study included patients with malignant breast cancer stages I to III, as well as those with benign breast lesions, who were ineligible for

conventional breast conservation surgery with high tumor to breast ratio, and those who opted for oncoplastic breast surgery. In addition to cancer patients, few non-cancer patients seeking mammoplasty were also included in the study.

Exclusion Criteria: Stage IV patients and those who underwent conventional breast conservation surgery were excluded from the study.

Purposive sampling was performed between January 2023 and July 2024, in both upfront and post-chemotherapy settings. All patients went through Triple Assessment for breast lesions, with staging according to AJCC breast cancer staging system. This involved ultrasound of the abdomen, chest radiography, contrast-enhanced CT of chest, abdomen, and pelvis (CECT CAP), and bone scan. Patients were then categorized into early breast cancer (EBC), encompassing stage I, II and locally advanced breast cancer (LABC), including stages III. Each case was reviewed in MDM, which includes surgical and radiation oncologist, histopathologist and radiologist.

All cases, both malignant and benign, were thoroughly reviewed during MDM, with a focus on ensuring oncological safety. Detailed counselling was provided regarding the type of surgery, neoadjuvant or adjuvant treatments, and informed consent was obtained for pre- and post-procedure photographs to assess aesthetic outcomes. Patients were monitored for postoperative complications, including bleeding, infection, flap necrosis, seroma formation, fat necrosis, recurrence, and length of hospital stay. Follow-up evaluations were conducted on the 1st, 2nd, and 6th weeks after discharge, and at 6 and 12 months postoperatively.

All malignant and pre-cancerous cases received chemotherapy and radiation therapy based on MDM recommendations. Patients who were hormone receptor-positive were started on hormonal therapy and immunotherapy was administered as needed. Skin-sparing mastectomy with latissimus dorsi reconstruction (SSM with LD reconstruction) was performed in collaboration with plastic surgery team. Data was analyzed by using Statistical Package for Social Sciences (SPSS) 27.00. Quantitative data was represented using mean $\pm$ standard deviation and qualitative data was represented by using percentage and frequency.

RESULTS

A total of 46 patient were recruited with a mean age of 47.0±12.6 years, minimum age was 19 and maximum age was 65 years. Table-I shows different clinicopathological features of patients.

Table-I: Clinicopathological Features of Patients (n=46)

Variable(s)	Values
Menopausal status(years)	
Premenopausal	27(58.7%)
Postmenopausal	19(41.3%)
Co morbidity	
Diabetes Mellitus	12 (26.1%)
Hypertension	9(19.6%)
Other	25 (54.3%)
Family history	
Positive	10(21.7%)
Negative	36(78.3%)
Tumor	
Benign	6(13.0%)
Pre-cancerous	4(7.0%)
Malignant	36(78.3%)
cT1	3(6.5%)
cT2	31(69.6%)
cT3	2(2.2%)
Parity	3.84 ±1.90
Breast feeding	
Done	39(84.8%)
Not done	7(15.2%)
Laterality	
Right	25(54.3%)
left	21(55.7%)
Quadrant	
UOQ	19(41.3%)
LOQ	1(2.2%)
UIQ	6(13%)
LIQ	5(10.9%)
Retro areolar	14(30.4%)
Macromastia	1(2.2%)
Surgical setting	
Upfront	30(65.2%)
Post chemotherapy	10(21.7%)
Focality	
Unifocal	36(78.3%)
Multifocal	10(21.7%)
Stage	
0	4(8.7%)
1	10(21.7%)
2	23(50%)
3	3(6.5%)
Type of oncoplastic procedure	
Donut	11(23.9%)
Round block	4(8.7%)
Grisotti	2(4.3%)
Wise pattern	2(4.3%)
SSM with LD flap reconstruction	7(15.6%)
AICAP	3(6.5%)
LICAP	5(10.9%)
Crescent	2(4.3%)
Parallelogram	10(21.7%)
Axillary surgery	
SLNB	21(45.7%)
ALND	6(34.8%)

ALND: Axillary Lymph Node Dissection, AICAP: Anterior Intercostal Artery Perforator Flap, cT: clinical tumor size, DM: diabetes mellitus, HTN: hypertension, UOQ: upper outer quadrant, UIQ: upper inner quadrant, LOQ: lower outer quadrant, LIQ: lower inner quadrant, SSM: Skin Sparing Mastectomy Latissimus Dorsi (LD), LICAP: Lateral

Intercostal Artery Perforator Flap, SLNB: Sentinel Lymph Node Biopsy .

Majority of patients had invasive ductal carcinoma no special type, and upfront surgery was performed in hormone receptor patients. Table-II shows histopathological features of tumors.

Table-II: Histopathological Features of Tumor (n=46)

Histological type	Frequency (%)
Invasive ductal carcinoma NST	33(71.7%)
Invasive lobular carcinoma	2(4.3%)
DCIS	4(8.7%)
Phyllodes	5(10.9%)
Others	2(4.3%)
Subtypes	
Luminal type A	19(41.3%)
Luminal type B	12(26.1%)
TNBC	4(8.7%)
Her2 enrich	1(2.2%)
Grade of tumor	
G1	1(2.2%)
G2	23(50.0%)
G3	12(26.1%)

NST: No Special Type, DCIS: Ductal Carcinoma In Situ, TNBC: Triple Negative Breast Cancer

All patients were observed for early post operative complications. There was no difference in complication rate in upfront cases or post chemotherapy patients, accordingly there was no delay in commencement of adjuvant treatment in form of chemotherapy or radiation therapy. Record of documented post operative complications is mentioned in Table-III.

Table-III: PostOperative Complications (n=46)

Complication(s)	Frequency (%)
Bleeding/hematoma	2(4.3%)
Wound infection	4(9.3%)
Seroma formation	7(15.7%)
Wound dehiscence	2(4.3%)
Completion ALND	2(4.3%)
Fat necrosis	3(6.5%)
Recurrence	2(4.3%)
Re excision	0 (0.0%)

The patients who developed hematoma were re-explored within first 24hrs of surgery and patients were stable post operatively but there was a resultant slight increase in hospital stay. Of these 9.3 % of patients who developed wound infection were treated with antibiotics as per culture and sensitivity and were treated as outdoor patients. In 16% patient seroma was

developed and out of these only one patient needed needle aspiration once, all other cases were counselled, and pressure garments were advised. Two patients required re-suturing for wound dehiscence under local anesthesia and were treated as outdoor cases. On 6 and 12 monthly follow up, four patients had BIRAD 4a and 4c lesions with suspicion of recurrence and their core biopsy showed fat necrosis in two patients. One patient with fat necrosis also developed a sinus tract for 1 month which was treated conservatively. While two patients had biopsy proven local recurrence, both the patients had SSM with LD reconstruction and were lost to follow-up for more than 6 months, due to fear of chemotherapy. Forty seven percent of patients underwent SLND, and 2 patients underwent completion ALND after completion of chemotherapy and 2 patients had radiation to axilla as per AMAROSE trail. Unfortunately, 2 patients developed distant metastasis during treatment, one was Grade III, triple negative breast cancer (TNBC) while the other one had luminal B tumor. Mean stay at hospital was 2.20 ± 1.8 days. None of these patients needed Re admission and hospitalization. Mean follow-up was 8.9 ± 4.4 months and majority of patients were satisfied with their outcome, and none underwent contralateral corrective surgery.

DISCUSSION

The findings of our study show that oncoplastic breast surgery, despite its associated early postoperative complications, achieves good aesthetic outcomes and is safe across all age groups and surgical settings. Oncoplastic surgery combines oncologic and reconstructive techniques for managing larger breast lesions, addressing the challenges of ensuring oncologic safety and achieving good aesthetic outcomes following a sizeable tumor excision.¹¹ Nakhliis *et al.* reported that on oncoplastic breast conservation surgery achieved breast conservation in over 90% of cases with low re excision rates of (4-12%) combining oncological safety with aesthetic benefits,¹² In our study, no patients required margin re-excision, the oncoplastic approach allowed for the excision of large tumors with clear margins, with most patients expressing satisfaction with their aesthetic results. The result of our study is in agreement with previous studies.¹³ S. Kosasih *et al* shows a significant benefit for O-BCS was observed in terms of re-operation rate.¹⁴ In our study post operative complication like hematoma was seen in

4.3% patients which was comparatively high as compared to Blok *et al.* whose study showed hematoma formation in 1.4 %. The hematoma formation can be reduced with addition of tranexamic acid.¹⁵ Our study showed infection rate in 9.3% which was comparable with the study conducted by Blok *et al.*¹⁵ Mehmood *et al* showed no post op complications.¹⁶ According to another study No difference in early post operative complication were noted.¹⁷

Average age of patients in our study was 47 years, with 60% under the age of 50. This contrasts with findings from Crown *et al.*, which stated average age of 59.6 years.¹⁸ Another study Morrow *et al.* shows mean age of 61.2 years.¹⁹ Andre *et al.* showed that oncoplastic surgery was more opted by young patient as compared to old age which is comparable to our study.²⁰ Importantly, no age-related factors were associated with postoperative complications or length of hospital stay in our cohort. Additionally, there was no delay in the initiation of adjuvant therapy, with all patients receiving radiation therapy as per protocol. These findings are consistent with existing studies, where similar outcomes were noted when comparing traditional breast-conserving surgery with oncoplastic techniques. Another study by Rasmussen *et al* shows same result despite more complication rate in oncoplastic surgery.¹³ Our results highlight the need for better patient education regarding oncoplastic procedures. Our study shows two patient with distant metastasis with mean follow-up of 9 months while Kosasih *et al* shows no recurrence with mean follow-up of 32 months.¹⁴

In our study, the majority of patients had clinical T2 disease, followed by T1, and a minority were T3. These results were comparable to study by Andre *et al.*, which also shows T2 as a prominent category.²⁰

CONCLUSION

Oncoplastic Breast surgery effectively combines cancer treatment with aesthetic benefits, enhancing patient satisfaction. However, our findings revealed some early complications. They are manageable, and surgery is safe across all age groups. This study emphasizes the importance of careful patient selection and precise surgical planning to improve outcomes and advance the quality of Breast Cancer Care.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

AS & MMJ: Data acquisition, data analysis, critical review, approval of the final version to be published.

ZJA & ZA: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

SG & SRN: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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