

Results of Level-II oncoplasty in breast cancer patients: An early Experience from a tertiary care hospital in Pakistan

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Abstract

Objective: To assess the oncologic and cosmetic outcomes for breast cancer patients who underwent breast conservation therapy using Level II oncoplasty techniques.

Methods: The prospective, non-randomised and descriptive study was conducted at the Department of Surgery, Unit IV of Civil Hospital, Karachi, from December 2009 to November 2011 in which 21 consecutive women with breast carcinoma who underwent wide local excision with remodeling mammoplasty were enrolled. All patients were reviewed by the surgeon and medical oncologist every 3 months for the first year. A grading system of 5-1 (excellent to poor) was employed and those with 3 or more were considered to have acceptable results.

Results: The mean patient age was 45.38 ± 10.09 years (range: 26-70); 11 (52.3%) were premenopausal and 10 (47.7%) were postmenopausal; and 5 (27.8%) had family history of breast cancer. The mean size of the tumour determined by histology was 59.9 ± 3.18 mm (range: 25-150). Eight (30%) patients received preoperative chemotherapy to downsize the tumour. Three (14.2%) patients received preoperative radiotherapy. Mean operative time was 1.59 ± 0.52 hours (range: 1-2.5 hours). Mean volume of breast tissue excised from the breast containing the tumour was 545.27 ± 412.06 cm³ (range: 43.70-1456). Assessment of excision margins showed no tumour at the margins of 19 (90.4%) patients. Two (9.5%) patients had close but negative margins. The mean hospital stay was 7.10 ± 3.30 days (range: 4-15). There were early complications in 4 (19%) patients. One (4.76%) patient had late complications. Two (9.5%) patients developed tumour recurrence; both had an ipsilateral tumour recurrence. None of the patients developed metastases and one died of cardiac problem. Twenty (95.2%) patients had an acceptable post-surgical cosmetic result.

Conclusion: Level II oncoplasty was a safe option in breast conservation allowing large-sized and difficult-location tumour excision with good cosmetic outcome in the study group. There is a need to increase the awareness and acceptance of this new technique not only amongst patients but also doctors.

Keywords: Breast oncoplasty, Level II breast oncoplasty, Breast conservation, Cosmetic outcome, Early breast cancer. (JPMA 64: 309; 2014)

Introduction

Management of breast cancer has undergone a revolutionary change over the past decade. Recent emerging technique is the breast conserving surgery combined with some sort of cosmetic surgery, thus balancing good cosmetics and local control of the disease. This new technique is called breast oncoplastic surgery. It results in lower psychological morbidity, improved sexuality, body image and self-esteem.

Breast-conserving therapy (BCT), consisting of lumpectomy followed by radiotherapy, has become the standard form of treatment for invasive breast carcinomas

up to 4-5cms and is increasingly being used for ductal carcinoma in situ (DCIS) and larger tumours.¹⁻³ However, with BCT for large tumours, cosmetic outcome is often poor.^{4,5} The tumour size in relation to the breast size is one of the most important factors when attempting to obtain a cosmetically favourable result. A conflict exists, therefore, between performing a resection wide enough to obtain optimal oncologic control and not removing so much breast tissue as to leave a deformed breast or a large discrepancy compared with the other side. One way of resolving this conflict is to use plastic surgery techniques such as remodeling mammoplasty to reshape the breast immediately following lumpectomy with contralateral symmetrisation.

Oncoplastic techniques allow wide excision of the breast tissue without risking major local deformity. It helps to extend the scope of breast conservation surgery (BCS) to include the removal of tumours larger than 3-5cms without compromising the adequacy of resection or

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cosmetic outcome.⁶ The basic principle is incorporating the plastic surgery techniques for breast reshaping during the oncological resection, so much so that advanced mammoplasty techniques allow the resection of up to 50% of breast volume. When a remodeling mammoplasty is performed, because of the volume excised, contralateral symmetrisation is often indicated to achieve symmetry. Level II techniques are used for volume excision between 20-50%. These require skin excisions and are based on mammoplasty techniques.

Our study was undertaken to assess our experience of level II oncoplasty in early breast cancer patients in terms of oncologic safety and cosmetics. This is the first study of its kind to be undertaken in our part of the world.

Patients and Methods

The prospective study was conducted at the Department of Surgery, Unit IV of Civil Hospital, Karachi, from December 2009 to November 2012 and involved 21 consecutive women with breast carcinoma who underwent wide local excision with remodeling mammoplasty over a period of two years and followed up for one year.

The inclusion criteria entailed patients with large tumours in whom a standard lumpectomy would have led to breast deformity/reduced possibility of obtaining wide, clear margins of excision for the tumour with BCT; difficult-location tumours like lower pole and upper inner quadrant tumours where removing a reasonable size tumour would have resulted in high risk of deformity; and post-lumpectomy patients with positive margins and cosmetic deformity.

The exclusion criteria entailed small breast size to tumour size ratio; multicentric carcinoma/inflammatory breast cancer; contraindication for radiotherapy; and patient's choice.

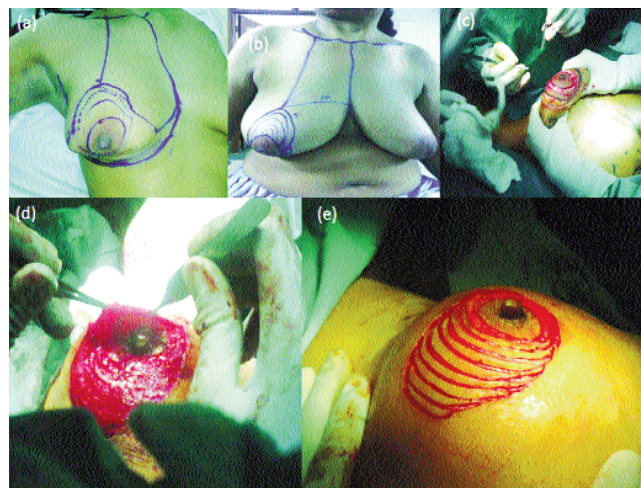
Thorough history was taken and clinical examination was done and all patients underwent metastatic workup preoperatively. Patient and tumour characteristics, details of adjuvant therapy, surgical technique and complications of surgery were all entered into a computerised database. Written and informed consent was taken from all the patients. Approval from the hospital ethical committee was also obtained. No patients were lost to follow-up. Patients were examined for postoperative complications, local or systemic recurrence of cancer, and cosmetic results. Radiotherapy to the breast and lymph nodes, chemotherapy, endocrine therapy, and axillary lymph node dissection were carried out according to standard protocols for all breast cancer patients. All patients were

given postoperative radiotherapy. Post-operative chemotherapy/hormonal therapy were given depending on the post-surgery histopathology report. A contralateral breast reduction procedure was offered to all the patients undergoing oncoplasty procedures.

In terms of surgical procedures, preoperative markings were done in all cases with the patient in the upright position (Figure-1).

Superior pedicle mammoplasty technique with an inverted T-scar was done for tumours situated in the central or inferior quadrants of the breast. The area surrounding the nipple-areolar complex (NAC) was deepithelialised. Inframammary incision and wide undermining of the breast tissue off the pectoral fascia starting inferiorly and proceeding superiorly beneath the tumour, the NAC (Figure-2), and towards the medial and lateral pillars of the breast was done next. The NAC was raised on a superiorly based flap. The excision of the tumour with at least a 1-cm macroscopic margin of normal tissue and overlying the skin was done. The mobilisation of the breast tissue allowed palpation of both deep and superficial surfaces of the tumour and helped in determining the lateral excision margins. The reconstruction procedure involved bringing together in midline the two medial and lateral glandular pillars to fill in the defect and recentralisation of the NAC to reshape the newly formed breast.

For laterally situated tumours, lateral mammoplasty technique was used. It included the fusiform and j-



NAC: Nipple areolar complex.

Figure-1: Steps of superior pedicle mammoplasty: (a-b) markings in upright position. (c,e) Deepithelialisation of peri-nipple areola complex (NAC) skin. (d) Raising NAC flap for recentralisation of NAC.



Figure-2: Superior pedicle mammoplasty. (a-b) Raising the inframammary crease flap deep to pectoralis fascia. (c) Inverted t shaped scar. (d-e) 9 post-op day after stitch removal.



Figure-3: Lateral Mammoplasty. a-b) fusiform mammoplasty c-d) j-Mammoplasty.

mammoplasty techniques. It involved wide tumour excision with superomedial NAC repositioning, on a dermo-glandular pedicle, to both counteract the lateral scar contraction and breast ptosis. The new NAC position was marked according to the standard protocol, its position about 19-21 cm from the suprasternal notch and 9-11 cm from the midline. Following peri-areolar de-epithelialisation using scalpel, the lumpectomy was performed as enbloc of skin and parenchyma down to the pectoral fascia in form of a pyramid with the base at the areolar margin and the apex at the lateral extremity of the breast. After parenchymal dissection from the pectoral

fascia, the glandular tissues were approximated by sutures, and closure was performed without separating the skin from underneath glandular tissue so there is no danger of irradiating thin skin flaps. Inferio-medial undermining allowed gland reconstitution and tension-free closure through parenchyma rotation. Level II axillary lymph nodes were dissected (Figure-3).

As for the Batwing technique, two closely similar half-circle incisions were made with angled wings to each side of the areola. The skin between the half circles and the wings (triangle) was then excised using scalpel. The upper side of the triangle was incised; the tumour undermined from above and then excised with macroscopically clear margins. The fibro-glandular tissue advanced to close the subsequent defect; the resulting triangle was put underneath the skin laterally from the defect. The defect was closed with subcutaneous and subsequently with subcuticular sutures. The axilla was cleared through a separate transverse incision along the axillary line.

All patients were reviewed by the surgeon and medical oncologist every 3 months for the first year. Bilateral mammograms were performed annually. A grading system with a score of 5 to 1 (5 excellent; 4 good; 3 fair; 2 mediocre; 1 poor), was used for cosmetic evaluation. This score was recorded by the doctor as perceived by the patient. Those with an average score of three or more were considered to have an acceptable result.

Results

The mean patient age was 45.38 ± 10.09 years (range: 26-70); 11 (52.3%) patients were premenopausal and 10 (47.7%) were postmenopausal; none had history of hormone replacement therapy (HRT) or oral contraceptive usage; 5 (27.8%) had family history of breast cancer; 17 (94.4%) were married; and 3 (16.7%) were nullipara.

The mean size of the tumour determined by histology was 59.9 ± 3.18 mm (range: 25-150). Tumour histology revealed there were 20 (95.2%) patients with invasive carcinoma (ductal or lobular) and 1 (4.8%) patient with DCIS or micro invasive carcinoma. Overall, 16 (76.1%) patients had presented with palpable mass. Five (23.8%) patients were post-lumpectomy margins had cosmetic deformity. Seven (33.3%) tumours were situated in the inferior quadrant, 10 (47.6%) in the superolateral, 3 (14.2%) in the superomedial quadrants, and 1 (4.7%) at the superior pole of the breast.

Eight (38%) patients who had a very large relative ratio between tumour and breast volumes received preoperative chemotherapy to downsize the tumour.

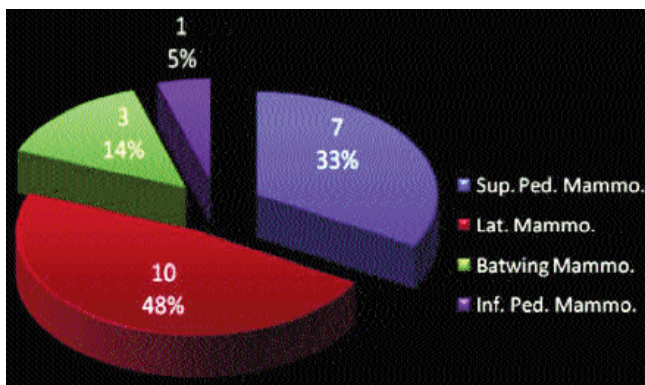


Figure-4: Types of surgical techniques.



NAC: Nipple areolar complex.

Figure-6: Superficial partial NAC necrosis.

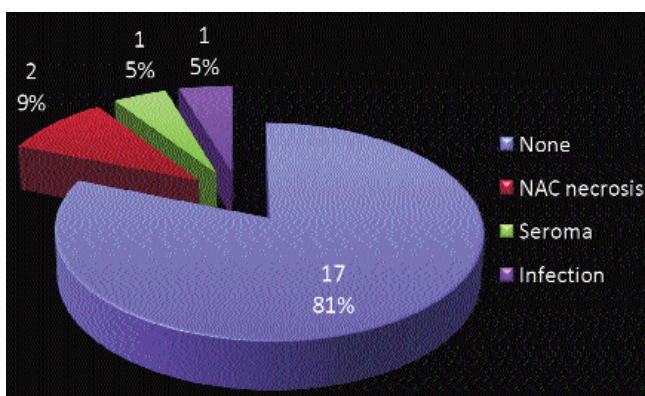


Figure-5: Complications.

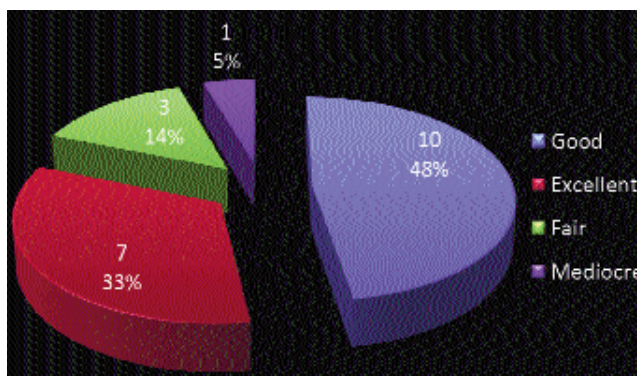


Figure-7: Cosmetic results based on patient assessment.

Three (14.2%) patients received preoperative radiotherapy. Four types of surgeries were employed (Figure-4).

Mean operative time was 1.59 ± 0.52 hours (range: 1-2.5 hours). Mean volume of breast tissue excised from the breast containing the tumour was 545.27 ± 412.06 cm³ (range: 43.70-1456). Assessment of excision margins showed no tumour at the margins of 19 (90.4%) patients. Two (9.5%) patients had close but negative margins. The mean hospital stay was 7.10 ± 3.30 days (range: 4-15).

There were early complications (<2 months after operation) in 4 (19%) patients (Figure-5). Of these, two patients with partial superficial NAC necrosis required a minor reoperation under local anaesthesia (Figure-6). One (4.7%) patient had seroma which was aspirated without any further consequence, while the other patient had superficial wound infection which required opening of 2 stitches and healed within 10 days. One (4.7%) patient had late complication (>2 months after operation) which was mainly cosmetic and consisted of breast fibrosis

secondary to radiotherapy.

Two (9.5%) patients developed tumour recurrence and both had an ipsilateral tumour recurrence. One (4.7%) patient had recurrent tumour in a different quadrant, while the other had tumour in the same quadrant and this patient had previously undergone contralateral mastectomy for cancer.

None of the patients developed metastases and one died of cardiac problem. One-year overall survival in our group was 20 (95.2%) patients. Disease-free survival at one year was 19 (90.47%), and 20 (95.2%) patients had an acceptable post-surgery cosmetic result (Figure-7).

Discussion

There is no clearly defined or visible compartment with anatomical landmark in breast like other organs, so resection for breast cancer relies on the width of normal tissue around the tumour, "the free margins". For years now, BCT has been the recognised treatment modality for

small tumours while mastectomy was offered for large breast tumours. It is sometimes difficult to achieve good cosmetic results particularly in patients with a large, ill-defined or poorly situated tumour for which clear margins are difficult to achieve without leaving deformed and asymmetrical breasts. Thus the dilemma in breast conservation is the balance between free margin, local recurrence rate and acceptable cosmetics. This issue has been addressed by the invention of the concept of breast oncoplasty which emerged as an additional surgical strategy 20 years ago.^{7,8}

While undertaking BCS one needs to be familiar with certain terminologies. Lumpectomy, which is removal of a palpable lump, was first popularised by Fisher,¹ whereas quadrantectomy was described by Veronesi.⁹ Quadrantectomy which involves removing a wedge shaped tissue is the most radical of the options for BCT. Sector resection is something between quadrantectomy and a lumpectomy. The resection specimen involves smaller amount of tissue compared with quadrantectomy with good cosmesis.¹⁰ Wide local excision is somewhat very close to sector resection and was described first by Aspegren.¹⁰

The main objective of breast oncoplasty is to allow oncologically safe breast conservation, by performing a wide excision for large or poorly located tumours, while limiting the risk of postoperative deformities. Evidence suggests that the risk of post-operative breast deformity increases when more than 20% of breast volume is excised.¹¹ The tumour size in relation to breast size is one of the important factors to be considered when attempting to obtain a cosmetically favourable result. Combining BCT with plastic surgery techniques has evolved as a new approach that has gained acceptance and is increasingly used as a new tool by breast surgeons worldwide.¹²⁻¹⁴

For tumours larger than 5cms there are increased chances of margins being involved,¹⁵ so oncoplasty is a safe option in such patients enabling wider excision with minimal deformity. Mean tumour size in our study was 59.9±3.18mm (range: 25-150). Mean tumour size reported by Clough et al. in different studies is 2.5 (4-90cms) and 3.2 cm (range: 15-60).^{16,17}

None of our patients had tumour at the margins; close margins were seen in only two patients. While clear margins are mandatory, there is still no consensus regarding the optimal amount of normal tissue removed around the tumour tissue. If the tumour does not extend to the surface of the specimen resected, it is considered free margin. Involved margins and the extent of margin

involvement have direct relation to risk of local recurrence.^{18,19} Several studies have concluded that free margin should be 5mm at least to reduce or reach a reasonable small number of tumour positive cavities in patients with invasive cancer.^{20,21} Our study, considered 5mm as close margin and 1cm as negative margin. Several prospective studies of more than 20-year follow-up have shown that the larger the free margins, the lower is the rate of recurrence.^{1,7} It has been established that larger the volume of tissue removed, the greater is the risk of cosmetic deformity. Several studies have documented that excision of volume of parenchyma >70cm³ in a medium-sized breast often leads to unacceptable cosmetic results.^{22,23} De La Rochefordiere et al.²⁴ and Taylor et al²⁵ have shown a decline in cosmetic scores if excised volumes are more than 86cms³ and 100 cms³. Cochrane et al²⁶ postulate that if specimen weight:breast volume is >10%, cosmetic outcome declines. Several studies have shown that oncoplasty procedures allow larger resections with mean volume of specimen upto 200cms³ compared with 117cms³ in quadrantectomy.^{27,28} The mean volume of breast tissue removed in our study was 545±412.06 cms³ in medium and large sized breasts which is larger than that reported by other series.^{16,17}

Oncoplasty techniques range from simple reshaping and mobilisation of breast tissue to more advanced mammoplasty techniques that allow resection of up to 50% of breast volume. However, certain tumour sites, particularly lower pole and upper medial quadrant along with large tumour size carry a high risk of postoperative deformity. These problems arise even after lumpectomy for small tumours and in some cases with large defects. Glandular flaps, recentralisation of NAC may be required.²⁹ Five patients in our study group had presented after lumpectomy elsewhere, with positive margins and cosmetic deformity. They all underwent level 11 oncoplasty allowing better cosmesis and margin clearance.

The major factor to be considered when deciding for oncoplastic surgery is excision volume, tumour location and glandular density. The average weight of specimen that can be removed by BCS is 20-80gms whereas several oncoplastic studies have shown that an average weight of 200-1000g or more can be removed without any cosmetic compromise.¹⁷ If <20% breast volume is excised, a level 1 procedure is done which requires undermining NAC recentralisation but no skin excision. Level II techniques are used for volume excision between 20-50%. These require skin excisions and are based on mammoplasty techniques. We have reported our experience of level II oncoplastic techniques.

Although oncoplastic surgery results in longer and multiple scars, the level of patient satisfaction is high. The cosmetic acceptance in our study was 95.2% which is comparable to that of international studies. Extensive resection in level II oncoplasty causes asymmetry in volume compared to the other side which may require immediate symmetrisation of contra lateral side if the patient desires or may be performed later after the completion of treatment. We had offered contralateral symmetrisation procedures to all our patients, especially those in whom volume loss was more and who underwent superior pedicle mammoplasty, but none of the patients opted for it. It may be due to cultural and social constraints in our population where thinking about breast reconstruction and cosmesis for female breast is still considered unacceptable. Most females were just happy with breast conservation but did not want to undergo any procedures on the normal side on the pretext that it might cause problems later on.

The key components in selecting a surgical approach are tumour location and associated risk of deformity. The oncoplasty atlas of surgical techniques based on tumour location published by Clough et al¹⁷ is an excellent guide for beginners in this field and helps in standardisation. Following that guide, we had performed superior pedicle mammoplasty in 7 patients, lateral mammoplasty, which involved J-mammoplasty, and fusiform mammoplasty in 10 patients, Batwing for central and upper quadrant tumour in 3 patients and inferior pedicle mammoplasty in 1 patient with upper pole tumour. These approaches are based on reduction mammoplasty technique, which was initially adopted for lower pole tumours and later on other locations like inner and upper outer quadrant techniques were developed.^{9,10,29,30}

Wide excision in upper inner quadrant of the breast distorts the overall breast shape by distorting the visible breast line known as *décolleté*. We used Batwing approach in our 3 patients having upper inner quadrant tumours with good results. This is in accordance with international literature.³¹

One-year overall survival in our group was 95.2% and we had recurrence in two patients after a year. Both patients underwent mastectomy. Disease-free survival was 90.47%. Recent retrospective review of a series of 298 patients with level II oncoplasty have shown a 5-year recurrence-free survival and overall survival of 93.7% and 94.6% respectively.³² Overall 5-year local recurrence rate in Rietjens study from European Institute of Oncology was 3% and 5-year mortality was 15%. Review of literature has shown 5 years recurrence rate ranging from 3-9.8%.⁶

Oncoplasty, if not done by experienced or surgeon trained for the procedure, can be associated with serious complications. Excessive undermining of skin or gland can lead to distressing complications of glandular necrosis which can be a real challenge to treat. This necrosis can become infected leading to dehiscence of the wound and delay in adjuvant treatment. We had seroma in 1 patient which required ultrasound-guided aspiration on 5th day with no refilling. Superficial wound infection occurred in 1 patient which required opening of 2 stitches and healed within 10 days. Two patients had partial superficial NAC necrosis and both patients required reshaping of the NAC under local anaesthesia and had delay of 2 weeks in their referral for adjuvant treatment. The complication rates cited in international literature range from 5-26%.^{17,33}

Conclusion

Level II oncoplasty was found to be a safe oncological option in breast conservation allowing large-sized and difficult-location tumour excision with good cosmetic outcome in our study group. Contralateral symmetrisation surgery was not allowed by any of our patients. There is a need to increase the awareness and acceptance of this new technique not only amongst patients, but doctors too.

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