

RESEARCH ARTICLE

Applicability of Oncoplastic Breast Conserving Surgery in Asian Breast Cancer Patients

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Abstract

Background: There are limited studies on oncoplastic breast conserving surgery in Asian women. We aimed to determine the applicability and safety of oncoplastic surgery, highlighting the specific circumstances when it will be most useful and compare our preferred technique with the worldwide practice of oncoplastic approaches. **Materials and Methods:** Breast cancer patients who underwent oncoplastic breast conserving surgery at a single institution from 1st May 2014-31st March 2015 were included. Data on patient demographics, tumor characteristics and the type of oncoplastic surgery performed were collected. **Results:** Nineteen breast cancer patients were identified. 42.1% of patients had grade I ptosis. The indications for surgery included a large tumor to breast size ratio (52.6%), multifocal/multicentric lesions (36.8%) and asymmetric breasts (10.6%), averting a mastectomy in 89.4%. Round block was the commonest technique in 63% of patients, in contrast to the inverted T pattern most frequently used in renowned institutions in the West. Mean and median tumor size and weight of specimen were 29.4/25mm (11 - 75mm) and 77g/64g (10 - 246g) respectively. Re-excision rate was 10.5%. Complete mastectomy was performed for one patient. One patient developed wound dehiscence which was treated conservatively. Cosmetic outcome was rated as excellent/good by 94.7% of patients. The patients remained clinically well after a median 16 months follow up. **Conclusions:** Oncoplastic breast conserving surgery is useful in a specific subgroup of Asian patients with a relatively small breast volume and minimal ptosis. Round block was the commonest technique in our series, in contrast to the worldwide utility of oncoplastic techniques. It is oncologically safe and has good cosmetic outcomes.

Keywords: Oncoplastic breast conserving surgery - Asian women - breast cancer

Asian Pac J Cancer Prev, 17 (7), 3325-3328

Introduction

Oncoplastic breast surgery is the utilization of plastic surgical techniques in breast cancer surgery to achieve safe oncologic removal of the tumor coupled with a good cosmetic outcome. Oncoplastic breast conserving surgery was first introduced in the West in 1990s (Petit et al., 1998; Zucca et al., 2013) but its use in the Asian countries is not widespread. Some of the reasons accounting for its dismal usage in Asian patients include a relatively smaller Asian breast size (Yang et al., 2011; Yang et al., 2011; Ogawa, 2014; Ha et al., 2015) and hence not suitable for the widely described reduction mammoplasty techniques, which were more commonly performed in the western population (McCulley and Macmillan, 2005).

To complicate matters, Asian patients tend to present late with a large tumor (Chang et al., 2011), making breast conservation even harder. Also, there were very few surgeons who were trained formally in oncoplastic breast surgery in Asia, resulting in limited access to oncoplastic breast surgery. Despite these difficulties, we believe that there is a role for oncoplastic breast conserving surgery in Asian women and aim to determine the

applicability and safety of oncoplastic breast conserving surgery in Asian breast cancer patients, specifically highlighting the circumstances in which oncoplastic breast conserving surgery was most beneficial in our local setting. A secondary aim was to identify the most suitable oncoplastic technique in our population and contrast that to the worldwide practice of oncoplastic techniques, especially that in the Western countries, which were more commonly reported in literature.

Materials and Methods

Retrospective analysis of biopsy proven breast cancer patients, who underwent oncoplastic breast surgery with breast conservation, from 1st May 2014 to 31st March 2015 at KK Women's and Children's Hospital, Singapore was performed. These patients were operated by a single surgeon and the inclusion criteria included patients who were keen and suitable for breast conservation therapy but were not suitable for standard wide local excision as the latter was likely to leave a cosmetic deformity post operation. Most of these patients had a large tumor to breast size ratio with an estimated 20% or more breast

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volume likely to be removed. Other indications included patients with multifocal/ multicentric breast tumors who would otherwise had needed a mastectomy or patients with breast asymmetry and tumor in the larger breast who wished to achieve breast symmetry post operation. Exclusion criteria for oncoplastic breast surgery included patients who were heavy smokers or unfit for surgery. Patients who were lost to follow up were also excluded.

The oncoplastic technique performed was determined by the surgeon after considering factors such as the patient's breast volume, ptosis, location and size of the tumor. The patient's desire of perceived breast size post operation, i.e. wanting to have a smaller or same breast volume, was also taken into consideration for the type of operation offered. Neo-adjuvant chemotherapy may be given as indicated to shrink the tumor if deemed necessary in order to allow breast conservation. Axillary surgery was offered to the patients with invasive cancers and an axillary clearance was performed in the presence of a histologically positive axillary lymph node. Post- surgery, these patients then received adjuvant treatment as deemed necessary following a multidisciplinary meeting.

Data collected included patient's demographics, type of oncoplastic procedure, its indications and complications, re- excision rates, tumor characteristics and patients' clinical outcome. These patients were followed up clinically till 31st March 2016.

The study obtained ethics approval from Singhealth Centralised Institutional Review Board (CIRB).

Results

A total of 20 breast cancer patients underwent oncoplastic breast conserving surgery. One patient was lost to follow up and hence excluded. The majority was Chinese (84.2%) with a median age of 51 years old (range, 36 – 73 years old) (Table 1). Nearly half of the patients had a medical comorbidity, of which hyperlipidemia was the commonest. None of the patients smokes. Most of the cancers (68.4%) were located in the upper outer quadrant and 87.5% of the patients with invasive cancer needed chemotherapy. Of the 4 patients who received neo-adjuvant chemotherapy, 50% had complete pathological response.

The majority of the patients (42.1%) had grade I ptosis and the indication for operation included a large tumor to breast size ratio in 10 patients, multifocal/multicentric lesions in 7 patients and asymmetric breasts in 2 patients.

Most patients (84.2%) had invasive ductal cancer and up to 75% of these patients had no lymph node involvement (Table 2). Mean and median tumor size and weight of specimen were 29.42/ 25mm (range, 11 -75mm) and 77/64g (range, 10 – 246g) respectively. Median foci of tumor involvement was 1(range, 1 – 6). Most of the cancers were of histologic grade 2 and Estrogen receptor (ER), Progesterone receptor (PR) positive and human epidermal growth factor receptor 2 (HER2) negative. Re-excision was performed for 2 patients (10.5%) and one of these patients had close (<2mm) margins for ductal carcinoma in situ (DCIS). One patient (5.3%) needed a completion mastectomy.

Round block was the commonest technique used in 63% of the patients. Other oncoplastic techniques included vertical mammoplasty (15.8%), wise pattern mammoplasty (5.3%) etc. as shown in Table 3.

The cosmetic outcome was assessed by the patients to be excellent/good in 94.7% of the patients. Only 1 patient reported fair outcome because of the smaller breast size though the breast shape was well maintained post operation.

Median length of stay was 2 days (range: 0-5). Only 1 patient who underwent wise pattern mammoplasty developed mild wound dehiscence which was treated

Table 1. Patient Demographics

Number of patients	19
Age/years	51 (36 – 73) ^a
Race	
Chinese	16 (84.2%)
Malay	3 (15.8%)
Co-morbidity	
None	10 (52.6%)
Hyperlipidemia	6
Hypertension	3
Diabetes mellitus	1
Increased BMI	1
Known endometrial cancer	1
Schizophrenia	1
Depression	1
Smoking status	0 (0%)
Chemotherapy status*	
Neo-adjuvant	4 (25%)
Adjuvant	10 (62.5%)
None	2 (12.5%)
Quadrant location of cancer	
Upper outer quadrant	13 (68.4%)
Lower outer quadrant	3 (15.8%)
Upper inner quadrant	2 (10.5%)
Lower inner quadrant	1 (5.30%)

^a Values are median (range)

* Invasive carcinomas only

Table 2. Pathologic Parameters

Histologic type	
Invasive ductal carcinoma	16 (84.2%)
Ductal carcinoma in-situ (DCIS)	3 (15.8%)
Tumor size /mm	25 (11 – 75) ^a
Weight of specimen /g	64 (10 – 246) ^a
Number of foci	1 (1 – 6) ^a
Hormonal status & HER2 status	
ER	
Positive	16 (84.2%)
Negative	3 (15.8%)
PR	
Positive	14 (73.7%)
Negative	5 (26.3%)
HER2*	
Positive	3 (18.7%)
Negative	13 (81.3%)
Tumor Grade	
I	4 (21%)
II	9 (47.4%)
III	6 (31.6%)
Lymph node status*	
pN0	12 (75%)
pN1	3 (18.75%)
pN2	1 (6.25%)
pN3	0 (0%)

^a Values are median (range)

* Invasive carcinomas only

Table 3. Type of Oncoplastic Surgery Performed

Volume displacement	
Round block	12 (63%)
Vertical mammoplasty	3 (15.8%)
Wise pattern mammoplasty	1 (5.30%)
Rotational flap	1 (5.30%)
Batwing mastopexy	1 (5.30%)
Volume replacement	
Crescent flap	1 (5.30%)

conservatively. Of note, this patient had diabetes and raised body mass index (BMI) of 35 which could account for the poor wound healing. The rest of the patients had no post-operative complication. All patients received adjuvant radiotherapy except for the patient who underwent a completion mastectomy.

After a median follow-up of 16 months, all patients remained clinically well with no evidence of recurrence.

Discussion

Our study revealed that oncoplastic breast conserving surgery was particularly useful in a specific subgroup of patients, such as patients with a large tumor to breast size ratio or in multifocal/multicentric tumors hence averting a mastectomy or in patients with breast asymmetry and cancer on the larger breast. Round block was the most commonly used technique in our Asian breast cancer patients who have a relatively smaller breast volume and minimal ptosis. In trained hands, there was minimal complication and good cosmetic outcomes were achieved.

Oncoplastic conserving breast surgery has been reported to be oncologically safe and could allow a larger mean tumor size (27mm) to be removed compared to a standard wide local excision (12mm) (Losken et al., 2014). As a result, lower re-excision rates of 2.7-4% in oncoplastic surgery versus 13.4%-14.6% in standard breast conservation therapy had been published by Chakravorty et al. (2012) and Losken et al. (2014) respectively. The completion mastectomy rate was however, higher in the oncoplastic breast conserving group at 6.5% (Losken et al., 2014). In comparison, the re-excision rate in our study was higher than those reported in literature and this was likely due to small sample size and the strict adherence to the ≥ 2 mm clearance criteria for DCIS as uninvolved margin (Neuschatz et al., 2002). Tumor size and completion mastectomy rate in our study however, were comparable to those reported in literature.

In our study, oncoplastic breast conserving surgery also had the added advantage of correcting breast asymmetry, especially when the cancer was in the larger breast, and treating multifocal/ multicentric lesions which were often deemed as an indication for mastectomy (Gentilini et al., 2009). In our cases, 89.4% of the patients were averted from a mastectomy. In addition, though neo-adjuvant chemotherapy has been reported to shrink the invasive cancers in 80% of cases (Fisher et al., 1997), hence making breast conservation possible, it is not indicated for pure DCIS. As a result, a large area of DCIS relative to the breast size may also benefit from oncoplastic surgery as witnessed by 10.5% in our series.

Clough et al. (2010) classified oncoplastic surgery into level I and II where level I requires minimal mobilization of breast tissue with little or no skin resection which is suitable for a maximum resection volume less than 20%. For resection volumes larger than 20%, a level I oncoplastic technique might not suffice and could result in significantly poorer cosmetic outcome as demonstrated in an Asian study (Chan et al., 2010). In these cases, level II oncoplastic techniques will be useful.

Various level II oncoplastic techniques have been described in literature but round block was the most suited for our local patients because of the relatively smaller breast size and minimal ptosis in Asian women. Round block technique, also known as Benelli or Doughnut mastopexy, was first proposed in 1990 (Benelli, 1990). It involves a circumferential areolar incision with de-epithelization around the areola and is suitable for tumor removal, in small or medium sized breasts with minimal ptosis, in nearly all quadrants of the breast (Chen, 2014). Being a versatile technique, it is also appropriate for patients with mild or moderate ptosis who want a small mastopexy after tumor resection, hence maintaining near symmetry of bilateral breasts. It is, however, contraindicated in patients with a central tumor involving the nipple areolar complex or in patients with large and very ptotic breasts. Though it leaves a cosmetically pleasing scar well concealed around the areola, it also has its shortcomings which include widening or asymmetry of the nipple areolar complex. To resolve this problem, a modified round block technique (Zaha et al., 2013) with the use of a wound protector, eliminating the need for de-epithelization has been described but this technique was only used in patients with upper half tumors and has a slightly longer median operative time.

In our case, round block was performed with de-epithelization of the periareolar skin. The nipple areolar complex was often maintained on a dermal blood supply and dissection of the breast was performed as widely as to allow oncologically safe resection of the cancer and subsequent mobilization of the adjacent breast tissue to cover the defect. A permanent monofilament suture was then used to purse-string the wound, so that symmetry of the nipple areolar complex can be maintained. The nipple areolar complex was then anchored at the four cardinal sites as described in the classical round block and final skin closure was performed.

For the smaller Asian breast, other oncoplastic techniques such as batwing mastopexy, tennis racket, parallelogram mastopexy lumpectomy etc. with its indications, have been reported to be suitable (Yang et al., 2011). However, all these techniques have the shortcomings of additional or less concealed scars compared to round block which leaves only an areolar scar. In addition, round block has the added advantage of allowing circumferential access to tumors located in nearly all quadrants in a minimally ptotic breast, permitting resection of multifocal/multicentric lesions, as shown in 15.8% of our patients. Though some of the above techniques, such as batwing and rotational flap, were also performed in our study, round block was preferred predominantly in most of our smaller breast volume

patients because of its cosmetic and access advantage over the rest of the described techniques.

In fact, varying usage of round block has been reported worldwide, with it being the predominant technique used in studies conducted in the Middle East population (27.5%) (Kaviani et al., 2014) and 40.3% in the South America (Acosta-Marin et al., 2014). This is in contrast with the practice in the Western countries wherein an inverted T mammoplasty (wise pattern) was the most common procedure performed in renowned centers in the United Kingdom (McCulley and Macmillan, 2005) France (Fitoussi et al., 2010) and in United States (Losken et al., 2007) We could not however find any data describing the frequency of use of the various mammoplasty techniques in studies conducted in Australia and Africa.

Our study is not without limitations. This is a single surgeon series with a small sample size and a short follow up period. Being a retrospective study, recall bias may occur but this was minimized with good record keeping and documentation. Patients lost to follow up were kept to a minimum as we have a robust system of recalling the patients who had missed their follow up.

With limited published studies of oncoplastic breast conserving surgery in Asian women, this study proves that oncoplastic surgery has its useful role even in the smaller breast volume Asian women with predominantly grade I ptosis if the appropriate technique was used. The pattern of usage of oncoplastic techniques in our series contrasted distinctly with the worldwide practice of oncoplastic techniques, especially those reported in the Western population. This illustrates the importance of individualizing the oncoplastic techniques to suit the appropriate patients. The results of our study are best to be validated prospectively in future studies.

In conclusion, oncoplastic breast conserving surgery has its applicability in a selected subset of patients. Round block was the most commonly performed technique in our series of Asian breast cancer patients who have a relatively smaller breast volume and minimal ptosis. It is safe and good cosmetic outcomes can be achieved. Though practice of oncoplastic techniques varies worldwide, it is important that the choice of the technique is individualized to suit every patient.

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