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The Use of Immediate, Delayed-Immediate and Delayed Oncoplastic Reduction Mammaplasty Techniques following Breast Conserving Surgery

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Abstract

Purpose: Oncoplastic surgical techniques are nowadays the gold standard in breast conservation therapy and following the right timing is mandatory in order to obtain a more than average cosmetic and functional result.

Materials and methods: The goal of the study is to consider the timing of oncoplastic reduction mammaplasty relative to the radiation by drawing a retrospective study that encompassed 19 consecutive patients who had oncoplastic reduction mammaplasty with patients classified into 3 groups: patients having breast conservation and reduction mammaplasty before radiotherapy, patients having reduction mammaplasty within the time interval between lumpectomy and radiation therapy, and patients having reduction mammaplasty after both lumpectomy and radiation therapy. A questionnaire has been used to assess quality of life and patient satisfaction following reduction mammoplasty.

Results: Nine patients had reduction mammoplasty immediately following partial mastectomy, four had reduction surgery in the delayed-immediate period, and six had delayed reduction mammoplasty. Patient satisfaction was very high among the immediate and delayed-immediate groups. Aesthetic assessment for the delayed group was lower but did not reach any significance when compared against the other groups.

Conclusion: Ninety percent of patients reported that they would have elected to undergo the procedure again based on their experience and aesthetic outcome. Complications are more frequent in the delayed setting.

Clinical implications: Oncoplastic surgery increases the oncological safety of BCT as larger breast volume can be excised resulting in larger respective specimens than with partial mastectomy alone. A contralateral reduction mammaplasty can be performed to obtain symmetry and balance, with consequent "surgical screening" of the contralateral breast.

Keywords: Oncoplastic surgery; Breast conserving therapy; Reduction mammaplasty; Radiotherapy; Breast reshaping

Introduction

Clinical Question/Level of Evidence: Therapeutic, IV

Text

Breast conservation therapy (BCT) is a popular treatment option for breast cancer patients. It has resulted in a paradigm shift in the traditional management of breast cancer. Although BCT has become a standard treatment for early-stage breast cancer, post-treatment assessment for aesthetic impact has not been instituted as a standard of care. The effect of BCT on aesthetic outcome is frequently underestimated and it is not irrelevant; significant asymmetry occurs in a considerable number of patients [1,2]. The addition of radiation therapy increases the risk for disfigurement and may manifest itself in skin contraction, tightening, breast distortion, and tissue pigmentation changes [3]. All these aspects may adversely affect subsequent reconstructive procedures [4]. Furthermore, the potential for unfavourable aesthetic outcomes has increased as a growing number of breast cancers that were once considered poor candidates are now being treated with BCT including large tumors and lesions located in unfavourable positions [5,6].

To address the concerns for unfavourable aesthetic outcomes following partial mastectomy, oncoplastic surgical techniques have been advocated [7-9]. The evolution of oncoplastic surgery has further modified the approach to BCT, and partial mastectomy defects can now be tailored and contoured to create an acceptable cosmetic and functional result [10,11]. Adequate partial mastectomy defects reconstruction can increase indications for BCT making breast conservation practical in patients who

otherwise might require a mastectomy, and minimize the potential for a poor aesthetic result.

Type of reconstruction

There are two fundamental types of reconstruction: volumedisplacement and volume-replacement procedures. The decision of which is more appropriate is based on breast size and shape, tumor or defect size, tumor locations and characteristics, and patients desires. Large or moderate-sized breasts with sufficient parenchyma remaining following resection are amenable to volume-displacement procedures involving local tissue reshaping and rearrangement by reduction mammaplasty techniques to fill in the dead space created by tumor resection. When additional tissue (volume and skin) is required to maintain the desired breast size or shape, volume-replacement procedures are required. The type and location of the resection also play a role in determining the type of reconstruction, especially when skin is removed with the specimen.

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Timing of reconstruction

The general trend is to reconstruct these defects before radiotherapy, with the benefits of operating on a non-irradiated, scarred, and poorly vascularised breast tissue. The main concern with immediate reconstruction is the potential for positive margins. Delayed-immediate reconstruction is a potential alternative, which gives the benefit of reconstruction before irradiation, with the certainty of negative margins, but at the price of a second procedure.

Delayed remodelling of irradiated breast tissue is technically challenging and often associated with surgical complications [12]. The glandular flaps are poorly vascularised and much less robust and subsequent scarring and distortion are common in the long term with progressive deterioration of cosmesis.



Figure 1: A 37-year-old woman with right invasive ductal carcinoma located in inner quadrant underwent partial mastectomy with remodelling mammaplasty. She underwent postoperative radiotherapy with no distortion or fibrosis in her treated breast.



Figure 2: A 43-year-old woman with invasive ductal carcinoma in her right breast. She underwent a wide local excision with sentinel node biopsy. The margins were negative for malignancy. Three weeks later, the patient underwent a delayed-immediate oncoplastic reduction mammaplasty. Markings are shown. A Wise pattern skin incision with a supero-medial pedicle for the nipple-areola complex and an inferior dermaglandular flap to improve breast shape and projection were used on both sides.



Figure 3: Preoperative view of a 34-year-old woman with previous left breast conserving surgery and radiotherapy for invasive ductal carcinoma in the upper quadrants. She successfully underwent delayed oncoplastic reshaping with inferior pedicle mammaplasty.

Recently the timing of oncoplastic reduction mammaplasty relative to the radiation therapy has been analysed in efforts to improve outcomes [13]. Immediate oncoplastic breast reshaping performed in conjuction with wide local excision has been advocated to avoid secondary operations and to minimize the psychological effects of breast distortion [14] (Figure 1). A concern about this approach includes an increased risk of a positive margin that may compromise the efficacy of this immediate approach and possibly result in a mastectomy. In the delayed-immediate reconstruction, reduction mammaplasty is performed within the interval following lumpectomy and preceding radiotherapy (Figure 2). This method allows for confirmation of negative margins after lumpectomy, and this option can result in breast conservation and may obviate the need for mastectomy in some situations. In the delayed setting, reduction mammaplasty is performed at some unspecified interval following radiotherapy (Figure 3). Worries about this approach include an increased incidence of complications that include wound dehiscence, seroma, infection, breast distortion, breast necrosis, and poor cosmetic outcomes [7,13].

Materials and Methods

A retrospective review was carried out on 19 consecutive patients who had oncoplastic reduction mammaplasty performed by the first Citation: Bonomi S, Salval A, Musumarra G, Settembrini F (2012) The Use of Immediate, Delayed-Immediate and Delayed Oncoplastic Reduction Mammaplasty Techniques following Breast Conserving Surgery. Anaplastology S1:002. doi:10.4172/2161-1173.S1-002

| | Total | Immediate | Staged- Immediate | Delayed |
|--|-------|-----------|----------------------|----------|
| Total no. of patients (%) | 19 | 9 (47,4) | 4 (21) | 6 (31,6) |
| Meanage, yr | 48,5 | 38,4 | 42,5 | 56,6 |
| Meanbody mass index | 30,5 | 31,1 | 29,8 | 30,6 |
| Chemotherapy | 16 | 8 | 3 | 5 |
| Meanintervalbetweenopera- tions, days | 103 | 0 | 29 | 280 |
| Meanduration of follow-up, wk | 137 | 85 | 98 | 230 |
| Pedicle(s) | 19 | 9 | 4 | 6 |
| Superior | 5 | 3 | 1 | 1 |
| Supero-medial | 6 | 3 | 1 | 2 |
| Supero-lateral | 3 | 0 | 1 | 2 |
| Inferior | 5 | 2 | 1 | 2 |
| Complicationsaftersurgery, n (%) | 7 | 2 (22,2) | 1 (25) | 4 (66,6) |
| Positive margins, n (%) | 2 | 2 (22,2) | 0 (0,0) | 0 (0,0) |
| Eventualmastectomy, n (%) | 2 | 2 | 0 (0,0) | 0 (0,0) |
| Recurrence, n (%) | 0 | 0 (0,0) | 0 (0,0) | 0 (0,0) |
| Controlateralbreastreshaping | 15 | 6 (66,6) | 4 (100) | 5 (83,3) |

Table 1: Patient Demographics and Perioperative Information.



Figure 4: Breast distortion, retraction and fibrosis in 56-year-old woman underwent delayed oncoplastic reshaping after BCT.

author (S.B.) between 2008 and 2010. Patient's data were collected regarding demographics, oncologic treatment and timing, and reduction mammaplasty techniques. Three groups of patients were isolated: the immediate group having breast conservation and reduction mammaplasty before radiotherapy, the delayed-immediate group having reduction mammaplasty within the time interval between lumpectomy and radiation therapy, and the delayed group having reduction mammaplasty after both lumpectomy and radiation therapy. Patients treated with volume-replacement techniques were not included in the study.

Each patient was evaluated either before or after lumpectomy and/or radiation therapy for evaluation of oncoplastic reduction mammaplasty. Pedicle choice and markings were designed based on tumor location and breast volume to adequately provide a good result.

A questionnaire to assess quality of life and patient satisfaction following reduction mammoplasty was used in our study to assess outcomes following oncoplastic reduction mammaplasty. The questionnaire asked patients to rank their satisfaction with their breast reconstruction on a scale of very disappointed, disappointed, satisfied, moderately satisfied, and very satisfied. Patients were asked whether they would undergo the same reconstructive procedure again and whether they would recommend it to other women.

Preoperative and postoperative pictures were obtained for evaluation. In the immediate and delayed-immediate groups, preablative pictures and postradiation pictures were used for evaluation. In the delayed group, prereduction and postreduction pictures were used for evaluation.

Analyses were performed using Stata/SE version 11.2 (StataCorp, Texas, USA). Categorical demographic variables were analysed via Fisher's exact test due to the small sample size. Means and deviations were calculated for continuous variables. Preoperative and postoperative evaluations were compared among the three groups. An a priori p value of 0.05 was used for all statistical analyses.

Results

Over a three-year period, oncoplastic reduction mammaplasty was performed on 19 patients; nine had reduction mammoplasty immediately following partial mastectomy, four had reduction surgery in the delayedimmediate period, and six had delayed reduction mammoplasty. The mean patient age across all the three groups was 48.5 years (range 31-69), and the mean BMI was 30.5.

The choice of the type of pedicle used to transpose the nipple areola complex (NAC) depends on the tumor location. Pedicle design varied among superior pedicle (5), supero-medial (6), supero-lateral (3), inferior pedicle (5). Specimen weight varied from 160 to 1085 grams. In the delayed-immediate group, the mean interval between operations was 29 days. Positive margins occurred in two patients, leading to completion mastectomy with immediate expander reconstruction in both cases. Fifteen patients received contralateral breast reshaping in order to obtain symmetry (Table 1).

Complications were seen in seven patients and included wound dehiscence, scar contractures/distortion, liponecrosis, infection and seroma (Figure 4). The majority of complications occurred in the delayed group (Table 2).

All of the patients returned the questionnaire demonstrating a response rate of 100%. Patient satisfaction was very high among the immediate and delayed-immediate groups regarding the breast shape, size, appearance (Table 3). Aesthetic assessment for the delayed group was lower but did

| | Total | Immediate | Staged-Immediate | Delayed |
|--------------------------------|-------|-----------|------------------|---------|
| Total complications | 7 | 2 | 1 | 4 |
| Wound dehiscence, n | 1 | 0 | 1 | 0 |
| Scarcontractures/distortion, n | 3 | 1 | 0 | 2 |
| Liponecrosis, n | 1 | 0 | 0 | 1 |
| Infection, n | 1 | 0 | 0 | 1 |
| Seroma, n | 1 | 1 | 0 | 0 |

 Table 2: Complications after procedures.

| | Total | Immediate | Staged-Immediate | Delayed |
|-------------------|-------|-----------|------------------|---------|
| BreastShape | 3,65 | 3,65 | 3,78 | 3,54 |
| Breast Size | 3,69 | 3,85 | 3,58 | 3,64 |
| Global Appearance | 3,75 | 3,9 | 3,74 | 3,62 |
| Total (mean) | | 3,8 | 3,7 | 3,6 |

*Survey answers were based on a four-point Likert scale, with 1 very dissatisfied, 2 somewhat dissatisfied, 3 somewhat satisfied, and 4 very satisfied.

Table 3: Patient's satisfaction.

Figure 5: Preoperative view of a 62-year-old woman with previous right breast conserving surgery and radiotherapy. Due to the heavy damage after radiation, she underwent lipofilling on the right and contralateral reduction mammaplasty, to improve symmetry.

not reach any significance when compared against the other groups, and 90 percent of patients reported that they would have elected to undergo the procedure again based on their experience and aesthetic outcome.

Discussion

Management of the partial mastectomy defect with oncoplastic techniques has become a widespread procedure, as BCT continues to gain acceptance and popularity [15-17]. The vast majority of women who are eligible for these procedures will benefit from them without compromising oncologic outcomes. Breast aesthetics can be further improved following oncoplastic procedures minimizing the effects of radiation therapy.

Several classifications systems have been developed to characterize the late breast conservation therapy deformity and suggest reconstructive options. Berrino et al. [18] classification system is based on the etiology of the deformity. In type 1, the deformity results from fibrosis and scar contracture. Displacement of the NAC is often present. In type II, there is a localized deficiency of tissue (skin, or parenchyma, or both). Type III has generalized breast retraction with normal overlying skin. This is most often secondary to radiation in patients with large, ptotic breasts. Finally, type IV deformity results from severe radiotoxicity. There is significant parenchymal retraction and distortion, and the skin has dramatic radiationinduced changes. The NAC is often displaced.

Clough et al. [19] described a classification based on response to reconstruction. Patients with a type-I breast deformity have a normal-appearing breast with no deformity. However, there is asymmetry in the volume or shape between breasts. These patients were primarily treated with contralateral breast surgery. Type-II patients have deformed breasts. The deformity, however, is deemed correctable primarily via ipsilateral breast surgery or flap reconstruction. Type-III patients have either major deformity of diffuse painful fibrosis of the treated breast. These patients were treated with total mastectomy and reconstruction. Therefore, Clough et al. [14] classified partial mastectomy defects into three groups, with different surgical treatment: (1) large defects in large breasts, which can be repaired by reshaping the breast with oncoplastic reduction mammaplasty, (2) medium defects in smaller breast, which require local flaps, and (3) large defects in medium-small breasts for which distant flaps are necessary.

Oncoplastic surgery increases the oncological safety of BCT as a larger breast volume can be excised, resulting in larger respective specimens than with partial mastectomy alone [20].

In most instances, a contralateral reduction mammaplasty or mastopexy is performed to obtain symmetry and balance, and this "surgical screening" of the contralateral breast may allow the diagnosis of occult carcinomas [21].

Delayed reshaping of an irradiated breast can be a problematic topic. In our study we reported a higher incidence of complications in the delayed group. Due to this reason, where volume asymmetry is the principal issue, a contralateral reduction is probably the best approach and avoids surgical intervention on an irradiated field unless the radiation damage is not relevant and patient wishes to undergo reshaping of the radiated breast accepting possible complications. Where there is marked distortion in shape of the treated breast, local glandular flaps should be avoided and distant flaps employed to bring fresh blood supply to the irradiated breast.

A recent new tool in treating breast conserving therapy sequelae is lipofilling [22,23]. Fat transfer following breast cancer treatment is a growing indication of oncoplastic surgery to improve the morphologic results after partial and total breast reconstruction. It is a simple technique that usually provides low complication rate and good cosmetic results, especially after radiotherapy, reducing the radiation damage (Figure 5). Nevertheless, in the effectiveness of this procedure, there are many clinical questions on lipofilling safety after breast cancer treatment, especially in breast conserving protocols. A recent multi-centric study [24] confirmed the lipofilling following breast cancer treatment leads to a very low complications rate and does not affect the radiologic follow-up after breast conserving surgery. Even if they could not provide definitive proof of the safety of fat transfer in terms of cancer recurrence or distant metastasis, lipofilling can be performed in experienced hands, with a cautious oncologic follow-up protocol.

Conclusions

Ideally, partial reconstruction should be undertaken as an immediate procedure following breast conservation therapy if optimal cosmetic results are to be achieved and maintained in the long term. If this scenario is not feasible, minimal adjustment should be performed in radiated breast, like lipofilling, or contralateral adjustment on healthy breast, unless new well vascularised flaps are provided.

Clinical Implications

Oncoplastic reduction mammaplasty can be safe and effective in carefully selected patients in the immediate, delayed-immediate, and delayed settings.

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