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Oncoplastic breast surgery:current strategies and outcome

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Abstract

Introduction

Oncoplastic surgery has emerged as a new approach to allow wide excision for breast conserving surgery without compromising the natural shape of the breast. It is based on integration of plastic surgery techniques for immediate breast reshaping after wide excision for breast cancer.

Objective: To study the different methods of oncoplastic surgery for breast reconstruction to achieve better aesthetic outcome and improve quality of life.

Patients and Methods: Thirty patients with breast cancer, treated at Sohag University Hospital between July 2016 to May 2017 were included in this study. The oncoplastic techniques performed were Local glandular tissue displacement in (60%), latissimus dorsi flap (LD) in (16.6%), superior pedicle flap in(10%), implant insertion in (6.6%) and Transverse rectus abdominus myocutanous flap (TRAM) in (6.6%). The choice of the oncoplastic techniques depends on the achievement of free safety margins, the breast volume, and its ptotic degree.

Results: The number of patients included in the study were thirty. The median age was 43 years (range; 20–60 ys). There were three major complications that require repeating the oncoplastic techniques. Recorded complications included wound infection (5/30, 16.6 %) donor site seroma (10/30, 33.3 %), postoperative haematoma (1/30, 3.3%), flap ischemia and necrosis (1/30, 3.3%). The 12-months subjective patient satisfaction was excellent in 27 (90%) patients, and bad in 3 (10 %) patients. There were two local recurrence, no systemic metastasis after an average follow-up duration of 12 months.

Conclusion: Restoring the defect after resection of the breast cancer can be safely achieved using oncoplastic procedures including the previous techniques with immediate breast reconstruction. In our patients, these procedures yield a satisfactory aesthetic outcome with lower morbidity.

Keywords

Oncoplastic breast surgery, Breast conservative surgery, LD flap, TRAM flap.

Introduction

Surgical management of breast cancer has evolved significantly over the last years, trending away from radical procedures, and moving towards those with complete resection of tumor while preserving normal parenchyma tissue thereby decreasing patient morbidity. This shift has allowed for improved aesthetic outcomes and quality-of life for patients, while maintaining equivalent oncologic safety ***(Fisher, 2002).*** A more recent innovation to further enhance aesthetic outcomes has been the development of "oncoplastic" surgery, which broadly refers to reconstruction of partial mastectomy defects. A variety of techniques have been described for partial mastectomy reconstruction, including local tissue rearrangement ***(Clough et al., 1999)***, reconstruction through reduction mammoplasty or mastopexy approaches ***(Anderson et al., 2005)***, and transfer of local-regional flaps ***(McCulley and Macmillan, 2005)***. The rapidly expanding body of literature on outcomes following oncoplastic

surgery has shown numerous benefits to this reconstructive approach, including improved aesthetic outcomes ***(Oden et al., 2012)***, better control of tumor margins, ***(Losken et al, 2014)*** high patient satisfaction ***(Barneaet al., 2014)***,and the ability to extend the option of breast conservation ***(Changet al., 2012)***.

Patients and Methods:

This study was a prospective non-randomized study which was conducted at Sohag University Hospital, General Surgery Department. The patients with breast cancer attended to outpatient clinic over one year from July 2016 to May 2017 were selected based on selection criteria to be included in the study.

An informed, both written and verbal consent approved by the Sohag Medical Ethics Committee was taken from all patients participated in the study after explaining the details of surgery, the possibility of a secondary surgery, and the possible complications.

The study included thirty patients presented with early breast cancer stage I or II according to TNM classification during the period of the study, analysis of the clinical presentation, different methods of diagnosis and treatment and reconstruction options.

All women with breast cancer presented to Sohag University Hospital out-patient clinic will be enrolled in this study according to the following criteria:

- Age ranging from 20 to 60 years;
- Patient was fit to surgery;
- Patient had intact skin without tumor invasion;
- Breast cancer with stage I, or II (TNM); and Consent for inclusion in the study.

The patients with the following criteria are excluded from our study:

- Age less than 20 or more than 60 years;
- Tumor invasion to the skin;
- Breast cancer with stage III, IV;
- Large sized tumor;
- Multifocal disease; and Diffuse microcalcification in mammography.

The choice of the technique for oncoplastic breast surgery (OPS) in breast conservative surgery (BCS) depends on elements related to the tumor location, size, and multifocality/ multicentricity, characteristics of the breast, and clinical evaluation of the patient. But we consider mainly mammary resection volume over 20 % with other risk factors; ***(Clough, 1998)***:

- Tumor size/breast size;
- Multicentricity and multifocality;
- Location of tumor and proximity to skin;
- Distance between the tumor and the nipple–areola complex (NAC);
- Previous and future radiotherapy;
- Previous mammoplasty;
- Volume and shape of the breast;
- Level of mammary ptosis and breast asymmetry; and Liposubstitution level.

The Operative data collected in our study include the following:

- Anethesia type;
- Incision type;
- Method of breast mass excision;
- Method of breast reconstruction;
- Insertion of suction drain or not;
- Method of closure; and Weight of the breast mass.

We assessed the early postoperative outcomes and late outcomes according to the following:

Early postoperative outcomes include:

- Wound healing;
- Occurrence of hematoma;
- Occurrence of seroma;
- Occurrence of infection;
- Occurrence of flap ischemia or necrosis;

- Post-operative pain or not;
- The movement of the breast;
- Occurrence of lymphedema;
- Shape of the scar; and Postoperative hospital stay.

Late postoperative outcomes include:

- Aesthetic outcomes;
- Oncological outcomes; and Symmetry of the breast.

Patients were scheduled for follow-up every 15 days for the first month after discharge then every 3 months for the rest of the follow-up period (12 months).

Chemotherapy and radiotherapy (RT) in OPS:

Chemotherapy and RT are important in the management of breast cancer patients whether it is used either preoperative for downstaging of breast cancer or used postoperative for complete radicality of the tumor and prevent recurrence. In our study preoperative chemotherapy used in 10% of patients and postoperative chemotherapy used in 16% of patients**.** Preoperative RT used in only 6% of patients and postoperative RT used in 83.33% of all patients.

Methods used for breast reconstruction during our study:

1-Local tissue displacement: as seen in figure 1.

Fig 1: Female patient 50 years with Lt breast cancer at the upper outer quadrant (a) local excision of the mass was done with axillary evacuation from the same incision (b) with reconstruction done by local tissue displacement (c).

2-Superior pedicle flap: as seen in figure 2.

Fig 2: Female patient 30 years old with Lt breast cancer at 6 clock (a), local excision of the mass was done with axillary evacuation from an axillary incision (b), reconstruction done by superior pedicle flab with contralateral mastopexy (c).

3-Latissmus dorsi flap (LD flap): as seen in figure 3.

Fig 3: Female patient 45 years old with Rt breast cancer at the upper outer quadrant, skin sparing mastectomy was done (a) with latissmus dorsi flap reconstruction (b), the patient after two weeks (c).

4-Implant insertion : as seen in figure 4.

Fig 4: Female patient 44 years old with Rt breast cancer at the upper medial quadrant, local excision of the mass was done with reconstruction by implant insertion.

5-Transverse rectus abdominus myocutanous flap (TRAM flap) : as seen in figure 5.

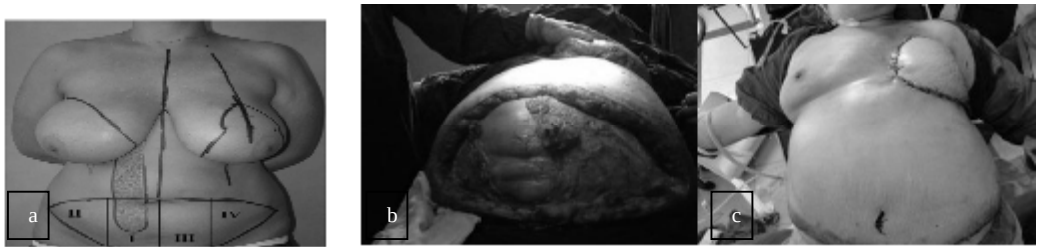

Fig 5 : Female patient 54 years old with Lt breast cancer at the upper outer quadrant (a) , Lt total mastectomy was done (b) with reconstruction by TRAM flap (c).

Results:

The median age was 43 years (range; 20 to 60 ys). The pathologic diagnosis was invasive ductal carcinoma grade I, or II. The oncoplastic techniques performed were Local glandular tissue displacement (60%) patients, LD flap (16.6%) patients, and superior pedicle flap (10%) patients, implant insertion (6.6%) and TRAM flap (6.6%).

Aesthetic results:

The 12 months subjective patient satisfaction was excellent in 27 (90%) patients, bad in 3 (10%) patients (table 1). There were three cases have major aesthetic complications, either in the skin envelop or loss of the reconstructed flaps and require revisional surgery to correct the situation.

Table 1: Patients' early outcomes after reconstruction (aesthetic outcome):

Variable	Number (%)
Aesthetic outcome	
Bad	**3 (10.00%)**
Good	**27 (90.00%)**
Wound healing	
Bad	**2 (6.67%)**
Good	**28 (93.33%)**
Symmetry to other breast	
Asymmetrical	**3 (10.00%)**
Nearly symmetrical	**6 (20.00%)**
Symmetrical	**21 (70.00%)**
Shape of wound	
Bad	**3 (10.00%)**
Good	**27 (90.00%)**

Postoperative complications:

Recorded complications included wound infection (5/30, 16.6 %), that was treated conservatively. Donor site seroma was seen in ten patients (10/30, 33.3 %), Four patients had LD flap reconstruction, all were managed conservatively by frequent aspiration except one patient who need operative intervention. The short-term surgical complications will be shown in (table 2).

Table 2: post operative complications:

Variable	Number (%)
Occurrence of hematoma	
No	**29 (96.67%)**
Yes	**1 (3.33%)**
Seroma formation	
No	**20 (66.67%)**
Yes	**10 (33.33%)**
Infection	
No	**25 (83.33%)**
Yes	**5 (16.67%)**
Flap ischemia or necrosis	
No	**29 (96.67%)**
Yes	**1 (3.33%)**

Survival and free disease survival rate:

Fortunately, no mortility were recorded in our study and the overall survival rate was 100%. with only two patients had recurrence in our study through follow up period (table 3) and the two patients underwent local tissue displacement, the disease free survival rate was 93.3%. No patient develop distant metastasis in a period of one year follow up.

Table 3: Late outcome after reconstruction (oncological outcome):

Oncological outcome	Number (%)
No recurrence	**28 (93.33%)**
Recurrence	**2 (6.67%)**

Discussion:

OPS has emerged as a new approach to allow wide excision for breast conservative surgery (BCS) without compromising the natural shape of the breast ***(Clough, 2009)***.

There are three factors to consider when selecting patients who may benefit from an oncoplastic approach for BCS. The two factors already recognized as major indications for OPS are excision volume and tumor location. The third additional factor is glandular density. When taken into consideration together, these three factors comprise a sound guide line for determining when and what type of OPS to perform and more importantly, to reduce the guess work in performing BCS ***(Rainsbury et al., 2009)***.

The median age group in our study was 43 years (range from 20 to 60 years), and this matching with ***(Jamal***

et al., 2008) study in which the median age group in his study was 45 years and matching with ***(Omar et al., 2015)*** study in which the median age group in his study was 40 years and this is the main age of incidence of breast cancer at ***(Hyo et al., 2014)*** study. And this is due to early methods for diagnosis of breast cancer and presence of screening program.

The main complaint of all our patients was breast mass, which occured at different sites of the breast, all breast masses occupying one quadrant of the breast except only one patient had a mass occupying the lower two quadrants of the breast. The most affected quadrant was the upper outer quadrant in 19 patients (63.33%). And this matching with ***(Jamal et al., 2008)*** study, in which most of the tumor location was present in the upper outer quadrant of the breast. And this may be explained that, the high proportion of upper outer quadrant carcinomas of the breasts is a reflection of the greater amount of breast tissue in this quadrant ***(lee, 2005)***.

In our study the median tumor size was 2.5 cm. this matching with ***(Jamal et al., 2008)*** study in which, the mean tumor size was 3.1 cm. and also matching with ***(Berry et al., 2010; Clough et al., 2003)*** studies in which, the median tumor size was 29.1 mm. This is explained by early diagnosis of breast cancer by screening program and increase awareness of the population about the disease.

Five different methods were used in our study for breast reconstruction, local tissue displacement in 18 patients (60%). LD flap in 5 patients (16.6%). Superior pedicle flap in 3 patients (10%). Implant insertion in 2 patients (6.6%). TRAM flap in 2 patients (6.6%). Different methods of breast reconstruction are used in different studies, ***(Jamal et al., 2008)*** use only the local tissue displacement techniques while ***(Omar et al., 2015)*** use Grisotti advancement rotational flap in eight (26.7 %) patients, classic skin-sparing mastectomy (SSM) with LD pedicled flap, and skin-reducing mastectomy (SRM) with LD pedicled flap using wise pattern inverted T incision in the rest of patients (71.4%).

As regard operative time the TRAM flap and LD flap take more time about 5 hours while local tissue displacement flap takes about 2 hours. In ***(Saira et al., 2015)*** study the operative time for oncoplastic procedures was 91 minutes and this time shorter because they have high volume referral Oncoplastic centre in comparison to our centre.

The average weight of the resected specimen after oncoplastic procedures as TRAM flap was significantly higher (175 gram) compared with the average weight of a local tissue displacement specimen at the same study (37.5 gram). This matching with ***(Pezzi et al., 2004)*** study in which, patients of small to moderate-sized breasts and resection volumes < 50 gram, volume displacement procedures were performed. In patients of resection volumes > 50 gram, volume replacement procedures were performed. Also matching with ***(Saira et al., 2015; Clough et al., 2003)*** in which mean specimen weight excised with oncoplastic procedures was177 gram.

As regard general aesthetic outcomes; 90% of the patients have good aesthetic outcome while 10 % of patients have bad aesthetic outcomes according to subjective method.

In our study level I procedure which is local tissue displacement was used in 18 patients with high degree of patient satisfaction (83.3%). Level II procedure was used in our study in large ptotic breast in 12 patients with relatively high degree of patient satisfaction (66.6%).

In a study of primary OPS for breast cancer, a variety of techniques were employed at the Institute of Curie between 1986 and 2007. A satisfactory subjective aesthetic outcome at 5 years was obtained in 90.3 percent and this is symmetrical to our study ***(Berry et al., 2010)***.

In one major prospective study assessing oncologic and cosmetic outcomes after oncoplastic techniques, ***(Clough et al., 2003)*** collected data from patients with breast cancer. After a median follow-up of 3.8 years, the cosmetic outcome was acceptable in 88% of patients and this is nearly symmetrical to our study.

In our study, seventeen patients (56.6%) with complications were encountered, ***(Clough et al., 2010)*** reported a rate of complications following oncoplastic surgery (fat necrosis, fibrosis, and hypertrophic scarring) of 10% which is too little than our study and this may be due to high volume referral centre.

In a study in Jordan University described and evaluated the results of a proposed simple technique of volume replacement by local tissue displacement to reconstruct the breast after BCS reported 8% complications; hematoma and fat necrosis during RT and this is too little than our study ***(Jamal et al., 2008)***. A study was done in Mansoura Surgical Oncology Centre. The recorded complications included wound dehiscence 13.3 %, donor site seroma 13.3 %, and surgical site infection 3.3 %. The total patients who were have complication 23% and also this rate is too much less than our study ***(Omar et al., 2015)***. This high rate of complications may be due to less experience about these techniques, and more studies should be done.

As regard oncological outcomes in our study, two patients developed local recurrence after nine months and both of them required mastectomy (6.6%). Two patients had positive resection margins, one underwent re-excision of the infiltrated margin and the other had poster doses of RT. No patient developed distant metastasis in one year follow up. Survival rate was 100%.

In a study of consecutive patients underwent primary OPS for cancer with high tumor-to-breast volume ratios and locations precluding a good aesthetic result with simple tumor excision, the Five-year overall and disease-free survival rates were 92.9 and 87.9 percent, respectively, with local recurrence in 6.8 percent ***(Berry et al., 2010).*** our results were good and nearly symmetrical to the previously mentioned studies. But more time is needed for follow up as one year follow up is too short period for detection of oncological outcomes.

In a study of outcome of OPS in 90 prospective patients done by ***(Tuomo et al., 2009)*** they reported the results of their oncoplastic breast operations during a median follow-up of 26 months; no local or regional recurrences were noticed while three patients developed distant metastases. And these results is good and nearly matching our results.

Summary and conclusion:

OPS combines the principles of oncologic and plastic surgery techniques to gain oncologically and aesthetically pleasing results. As these techniques become more accepted there is a demand for surgeons to become familiar with the indications and skills required to make oncoplastic surgery safe and effective.

The choice between different oncoplastic techniques are determined mainly by the site of the tumor in the breast, tumor characteristics, extent of resection, breast characteristics (size, shape and glandular density), previous surgery, and the expectations and wishes of the patient.

The main limitations of our study are the small number of cases enrolled in the study and the short period of follow up, but when considering the results of the previous similar studies, one can say that OPS can be a standard approach for breast cancer treatment when applied according to its own indications.

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