

# Extreme oncoplastic mammoplasty: a safe procedure that limits indications of mastectomy

Nagm Eldin Abu Elnga, Mohamed B.M. Kotb, Mahmmoud Thabet Ayoub, Mostafa Thabet Ahmed, Abdel Radi Abdel Salam

General Surgery Department, Assiut University Hospital, Faculty of Medicine, Assiut University, Egypt

Correspondence to Nagm Eldin Abu Elnga, MBBCH, MSc, General Surgery Department, Assiut University Hospital, Faculty of Medicine, Assiut University, Masna' CID, Al Zohor St. Assiut, 71515, Egypt. Tel: 002/ 01015417979; Fax: 002/ 0882333327; e-mail: nagmdairy@med.au.edu.eg

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## Background

Extreme oncoplastic breast surgery is a breast-conserving operation, using oncoplastic techniques, in a patient who, in most physicians' opinions, requires a mastectomy. These are generally large, greater than 5 cm, multifocal or multicentric tumors. This study aims to evaluate the oncologic safety and esthetic outcomes of extreme oncoplastic therapeutic mammoplasty in patients potentially required mastectomy at the first surgical opinion.

## Patients and methods

This study included 36 female patients who presented to Breast and Endocrine Surgery Unit, General surgery department, Assiut University Hospital, Egypt, with multifocal, multicentric, or locally advanced breast cancer (tumor span >5 cm) who were initially advised to do mastectomy and asked for breast conservation as a second opinion. The workhorse of oncoplastic techniques in our facility was the Wise pattern therapeutic reduction mammoplasty tailored according to the tumor site and breast cup size.

## Results

The mean tumor span for the 36 patients enrolled in this study was 6 cm (range: 2–9 cm). The mean of the least safety margins was 1.76 cm (ranges: 0.5–5 cm), and the mean of the maximum safety margins was 5 cm (ranges 2–9.5 cm). Three cases (8.3%) had wound infection, two cases (5.6%) had wound gapping, breast seroma developed in five cases (13.9%), loss of nipple–areola complex sensation was recorded in five cases, and fat necrosis occurred in three cases (8.3%). After a median follow-up of 37 months, local recurrence rate was 5.6% (2/36) and distant metastasis rate was 5.6% (2/36). Overall score of patient satisfaction was 'excellent' in 20 cases (55.5%), 'good' in 11 cases (30.6%), and 'fair' in five cases (13.9%).

## Conclusion

Properly selected patients who were initially scheduled for mastectomy as a standard surgical treatment of breast cancer can be safely treated by tailored therapeutic mammoplasty techniques of extreme oncoplastic breast surgery.

## Keywords:

breast-conserving surgery, extreme oncoplastic breast surgery, therapeutic mammoplasty

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## Introduction

For more than 100 years, starting in the 1880s, Halsted radical mastectomy reigned as the only and standard treatment for breast cancer. Then, during the 1970s and 1980s, six prospective randomized trials, some with a follow-up of 20 years, established equivalent survival rates for breast-conservation surgery with negative margins when compared with mastectomy for patients with tumors less than or equal to 5 cm [1–6].

Although survival was equal, the local recurrence rate was higher with breast-conservation therapy. This was accepted in exchange for a better cosmetic result and a happier, more intact patient. During the past 30 years, a significant progress in breast cancer diagnosis and treatment has been established. This includes earlier

stages of diagnosis with improved imaging modalities, better adjuvant (hormonal, chemotherapy, and target therapy) treatment, improved radiation therapy techniques, and an increased understanding of biological types and genomics of breast cancer [7]. This progress has yielded improved overall and breast cancer-specific survival. In addition, it has led to lower rates of local recurrence after both mastectomy and breast conservation.

Recently, prospective randomized trials have reported 5-year local recurrence rates less than 1.5% for patients

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randomized to lumpectomy plus standard whole-breast radiation therapy [8]. With these low local recurrence rates, breast conservation should be considered the default approach for breast cancer treatment, unless there are oncologic indications to perform a mastectomy.

Prospective randomized data supporting breast conservation exist only for patients with tumors 5 cm or smaller [1–6]. For that reason, many patients with larger tumors are denied a chance to seek breast conservation. Neoadjuvant therapy, to reduce the size of the primary lesion, will convert some tumors to a more appropriate size. At present, breast surgeons are attempting to extend the scope of breast conservation to include conditions that are otherwise contraindicated for breast conservative surgery, particularly in large tumor span (5 cm or more), multicentric (MC), or multifocal (MF) tumors. For these selected scenarios, the surgical answer may be extreme oncoplasty [9].

Extreme oncoplastic breast surgery (EOPBS) is a breast-conserving operation, using oncoplastic techniques, in a patient who, in most physicians' opinions, requires a mastectomy. These are generally large, greater than 5 cm, MF or MC tumors [10].

The role of EOPBS is to limit indications of mastectomy and allow breast conservation in conditions that are usually treated by mastectomy. These conditions include large tumors greater than 5 cm; MF breast cancer; MC breast cancer; tumors infiltrating nipple–areola complex (NAC); and locally advanced cancer with little or no response to neoadjuvant chemotherapy [11].

Therefore, the aim of this study was to evaluate the oncologic safety and esthetic outcomes of extreme oncoplastic therapeutic mammoplasty in patients potentially required mastectomy as the first surgical opinion.

## Patients and methods

### Patients

This study was conducted from May 2014 to May 2019 on 36 consecutive patients diagnosed with MF, MC, locally advanced breast cancer (tumor span >5 cm) or patients had no or poor response to NACT. Ethical approval was obtained before enrollment from local Medical Research Ethics Committee of Faculty of Medicine Assiut University. All these patients were initially advised to do mastectomy and asked for

breast conservation as a second opinion. All cases were discussed by multidisciplinary team including breast surgeon, medical oncologist, radiologist, and pathologist. All patients were considered as extreme cases and suitable for EOPBS.

### Surgical techniques

The workhorse of oncoplastic techniques in our facility was the Wise pattern therapeutic reduction mammoplasty. This versatile technique is the ideal option for women with breast cup size C or D. Based on tumor location, breast cup size, and degree of breast ptosis, a skin pattern and NAC pedicle are designed preoperatively to allow for resection of the tumor and filling of the tumor cavity defect with the remaining breast tissue. Therapeutic superior pedicle reduction mammoplasty was selected for tumors at lower quadrant, whereas inferior pedicle reduction mammoplasty was ideal for patients with upper quadrant tumors. These can also be applied to tumors that fall outside the Wise pattern by shifting tissue and rotating the reduction pattern.

Preoperative marking of each technique was done at the operative theater while the patient is in upright position starting by outlining the size of the tumor on the overlying skin. The patient was placed in supine position with extension of the ipsilateral arm at 90–100°. Intraoperative frozen sectioning analysis was done for all patients (Figs 1 and 2).

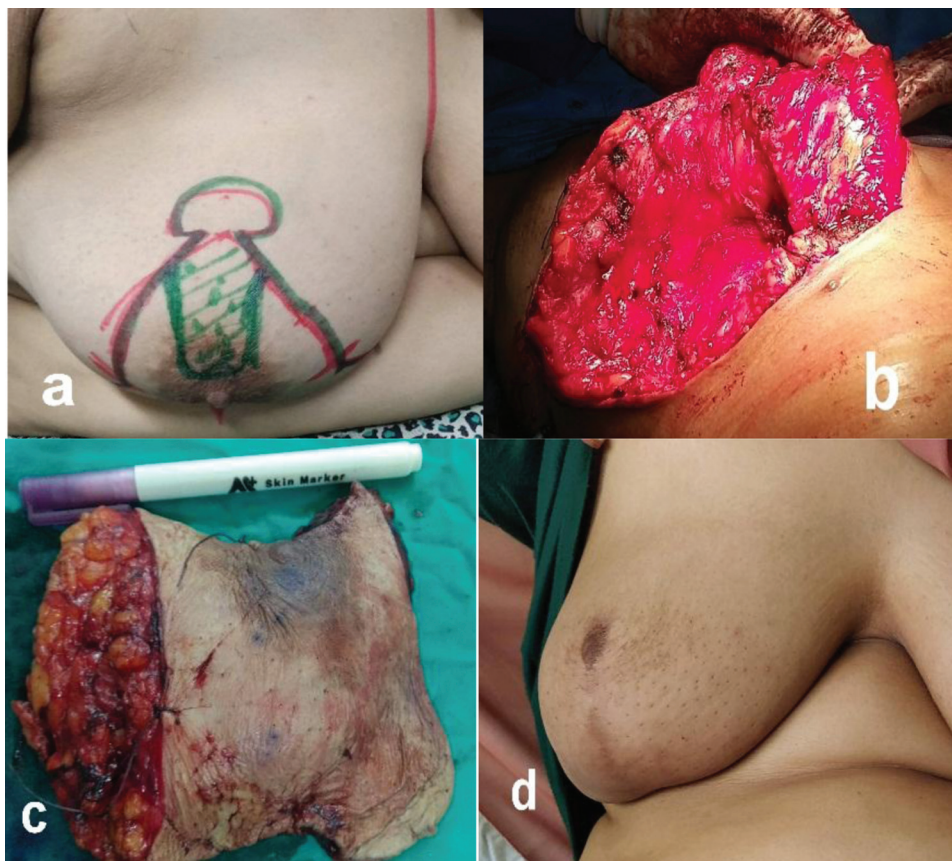
Data collection included demography, medical history, clinicopathological characteristics, details of adjuvant therapy, surgical intervention, postoperative complications, and follow-up details.

### Follow-up

After completion of their adjuvant therapy, patients were asked to come for follow-up in the surgical outpatient clinic once every 2 months for the first 2 years for clinical examination and breast US every 2 months at the first 2 years with breast MRI if suspicious lesions were detected.

Postoperative outcomes were assessed by breast surgeon. Complications such as seroma, hematoma, infection, skin necrosis, NAC necrosis, arm edema, and wound dehiscence were recorded. Complications were classified as 'major; when they required surgical intervention and 'minor; when they were managed conservatively. We also noted the time between completion of the surgery and start of the adjuvant therapy to ascertain any delays in the adjuvant therapy.

Figure 1



(a) Preoperative markings of Rt. Retroareolar breast cancer infiltrating nipple and inferior portion of areola with a tumor size 5.5 cm, resection plan of the tumor by extreme oncoplastic breast surgery based on therapeutic superior pedicle mammoplasty, with immediate nipple reconstruction. (b) Tumor bed after excision. (c) Specimen excised showing tumor with nipple and inferior portion of the areola. (d) 6-month postoperative view.

#### Assessment of the cosmetic outcome

One month after completion of their adjuvant therapy, patients were invited to answer a scoring scale questionnaire according to Calabrese scale [12,13], evaluating their own esthetic satisfaction ranging from 1 to 3, and the parameters that have been evaluated were breast shape, volume, and symmetry of the operated-on breasts.

This score was reduced by one point every time the following elements were identified:

- (1) Visible scar.
- (2) NAC badly placed.
- (3) Visible cutaneous effects from radiotherapy.

Then, after the sum of the whole parameters, the results were classified into the following:

- (1) Excellent (score 8–9).
- (2) Good (score 6–7).
- (3) Fair (score 4–5).
- (4) Poor (score 3 or below).

#### Results

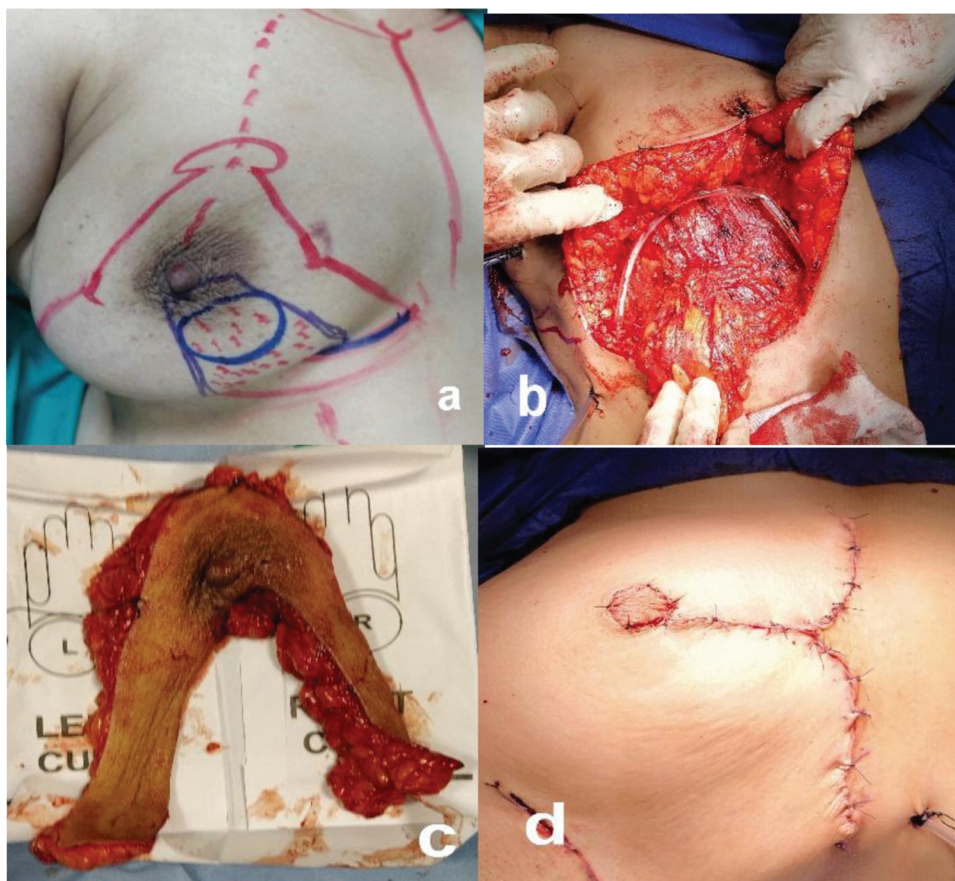
##### Patients' and tumor characteristics

The mean age of the 36 patients included in this study was 48.5 years (range: 28–65). A total of 24 patients (66.7%) had breast cup size C, eight patients (22.2%) with cup size B, and four patients (11.1%) with cup size D.

Invasive ductal carcinoma was the pathological type in 31 patients (86.1%), invasive lobular carcinoma in one case (2.8%), mixed type in two cases (5.6%), and Paget's disease with DCIS in two cases (5.6%). Two patients were staged as stage 0 (5.6%), six cases (16.7%) at stage IIA, 13 cases at stage IIB (36%), and 15 cases at stage III (41.7%).

The mean tumor span was 6 cm (range: 2–9 cm). We recorded two cases (5.6%) with Tis tumors, 10 patients (27.8%) were T2 breast cancer, and 24 patients (66.7%) were T3. Demographics and tumor characteristics are shown in Table 1.

Figure 2



(a) Preoperative markings of Rt. Retroareolar breast cancer infiltrating nipple–areola complex; resection of the tumor by extreme oncoplastic breast surgery based on inferior pedicle mammoplasty. (b) Tumor bed after excision. (c) Specimen excised showing tumor with nipple–areola complex. (d) Intraoperative view after wound closure.

### Postoperative complications

We recorded three cases (8.3%) of wound infection and two cases (5.6%) of wound gapping, where one of them managed by re-suturing, and the other case was left to heal by secondary intention. Breast seroma was recorded in five cases (13.9%) and managed by repeated percutaneous aspiration, and five patients (13.9%) lost NAC sensation. Fat necrosis was recorded in three cases (8.3%) who were presented by breast masses, and tru-cut biopsy was used to exclude recurrence.

### Oncologic and esthetic outcomes

The mean follow-up period was 37 months (ranges: 20–59 months); during this period, two cases (5.6%) developed local recurrence and two cases (5.6%) had distant metastasis.

The mean of the least safety margins was 1.76 cm (range: 0.5–5 cm), and the mean of the maximum safety margins was 5 cm (range: 2–9.5 cm).

With analysis of the patients' questionnaires regarding the shape, symmetry, breast volume, visible scar, and

NAC position, the overall score of the patient satisfaction was 'excellent' in 20 cases (55.5%), 'good' in 11 cases (30.6%), and 'fair' in five cases (13.9%). (Table 2).

### Discussion

BCT is considered a standard treatment option for selective patients of early breast cancer, allowing acceptable oncological safety and better esthetic outcomes. In patients with large tumors, BCT is feasible if excision margins are free of tumor and an acceptable cosmesis can be obtained [1].

breast conservative surgery had several limits, such as tumor span greater than 5 cm, MF, MC breast cancer and tumors near or infiltrating NAC. Extreme oncoplasty pushes these limits and replaces mastectomy in these cases [14,15].

In this study, mastectomy was the first surgical opinion in patients with different scenarios: first, patients with large tumor span greater than 5 cm and had a poor

**Table 1 Demographics and tumor characteristics**

Tumor characteristics	N=36 [n (%)]
Median age	48.5 (range: 28–65)
Breast cup size	
B	8 (22.2)
C	24 (66.7)
D	4 (11.1)
Tumor pathology	
Invasive ductal carcinoma	31 (86.1)
NST	29 (80.5)
Papillary subtype	1 (2.8)
Mucinous subtype	1 (2.8)
Invasive lobular carcinoma	1 (2.8)
Paget's disease	2 (5.6)
Mixed (IDC and ILC)	2 (5.6)
Molecular type	
Luminal A	11 (30.6)
Luminal B	12 (33.3)
Her 2/neu enriched type	7 (19.4)
Triple negative	6 (16.7)
TNM stage	
Stage 0	2 (5.6)
Stage IIA	6 (16.7)
Stage IIB	13 (36)
Stage III	15 (41.7)
Neoadjuvant chemotherapy	19 (52.8)
Adjuvant chemotherapy	35 (97.2)
Adjuvant RT	36 (100)

IDC, invasive ductal carcinoma; ILC, invasive lobular carcinoma; NST, non specific type; RT, radiotherapy.

response to NACT; second, MC and MF breast cancers; and third, Paget's disease of NAC with DCIS extending greater than 40% of breast volume. All patients denied mastectomy and asked for a second opinion that can preserve breast.

Therapeutic mammoplasty techniques were the standard treatment option offered for the 36 patients enrolled in this study to replace mastectomy.

In this study, the mean of the least safety margin obtained was 1.8 cm and ranged from 1 to 5 cm, and the mean of the maximum safety margin was 5 cm and ranged from 3 to 9.5 cm.

Intraoperative frozen section analysis for all cases was routinely done and revealed infiltrated margins by invasive carcinoma in two cases (5.6%) and DCIS in one case (2.8%); all these cases were managed by intraoperative re-excision, with final pathology report showing negative margins. Postoperative re-excision and/or mastectomy were not required in any case in this study. Caruso *et al.* [16] reported in their study infiltrated margins in five patients (8.2%) out of 61 patients who underwent therapeutic mammoplasty.

**Table 2 The esthetic outcome scored by the patients**

Cosmetic score	N/n (%)
Excellent	20/36 (55.5)
Good	11/36 (30.6)
Fair	5/36 (13.9)
Overall score	Excellent

Local recurrence rate was 5.6% (2/36) during the mean follow-up period of 37 months, which can be compared with that reported in the study of Rietjens *et al.* [17], which encountered a 5-year local recurrence rate of 3% and a distant metastasis rate of 13% in their study of 148 patients.

In this study, we reported minor postoperative complications with no major complications. Neither of these complications affected patient's general health nor caused a delay in delivery of adjuvant therapy.

The overall score of patient satisfaction was 'excellent' in 20 cases (55.5%), 'good' in 11 cases (30.6%), and 'fair' in five cases (13.9%). These results are close to the results of Roshdy *et al.* [18], which concluded that 73.3% of the patients were scored as excellent, 13.3% patients were scored as good, and 13.3% scored as satisfactory.

In spite of the promising outcomes of the EOPBS related to oncologic safety, esthetic satisfaction, and postoperative complications, our study has a few limitations. This study only described data from single breast unit with small number of patients ( $n=36$ ) with 37 months follow-up. To overcome these limitations, we need to continue recruitment of patients to increase the sample size and ensure long-term follow-up. In future, a MC study will be needed to avoid investigator bias.

#### Recommendations

From this study, we conclude that properly selected patients who were initially scheduled for mastectomy as a standard surgical treatment of breast cancer can be safely treated by tailored therapeutic mammoplasty techniques of EOPBS. EOPBS can be considered as a safe and feasible surgical option for such patients, without compromising oncologic principles or esthetic outcomes.

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Nil.

#### Conflicts of interest

There are no conflicts of interest.

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**References**

- 1 Fisher B, Anderson S, Bryant J, Margolese RG, Deutsch M, Fisher ER, *et al.* Twenty year follow-up of a randomized trial comparing total mastectomy, lumpectomy, and lumpectomy plus irradiation for the treatment of invasive breast cancer. *N Engl J Med* 2002; 347:1233–1241.
- 2 Fisher B, Bauer M, Margolese R, Poisson R, Pilch Y, Redmond C, *et al.* Five-year results of a randomized clinical trial comparing total mastectomy and segmental mastectomy with or without radiation in the treatment of breast cancer. *N Engl J Med* 1985; 312:665–673.
- 3 Veronesi U, Cascinelli N, Mariani L, Greco M, Saccozzi R, Luini A, *et al.* Twenty-year follow-up of a randomized study comparing breast-conserving surgery with radical mastectomy for early breast cancer. *N Engl J Med* 2002; 347:1227–1232.
- 4 Veronesi U, Saccozzi R, Del Vecchio M, Banfi A, Clemente C, De Lena M, *et al.* Comparing radical mastectomy with quadrantectomy, axillary dissection, and radiotherapy in patients with small cancers of the breast. *N Engl J Med* 1981; 305:6–11.
- 5 Lichter AS, Lippman ME, Danforth DN Jr., d'Angelo T, Steinberg SM, DeMoss E, *et al.* Mastectomy versus breast-conserving therapy in the treatment of stage I and II carcinoma of the breast: a randomized trial at the National Cancer Institute. *J Clin Oncol* 1992; 10:976–983.
- 6 Bartelink H, Fentiman I, Lerut T, Mignolet F, Olthuis G, Sylvester R, *et al.* Randomized clinical trial to assess the value of breast-conserving therapy in stage I and II breast cancer, EORTC 10801 trial. *J Natl Cancer Inst Monogr* 1992; 11:15–18.
- 7 Vaidya JS, Wenz F, Bulsara M, Tobias JS, Joseph DJ, Keshtgar M, *et al.* Risk-adapted targeted intraoperative radiotherapy versus whole-breast radiotherapy for breast cancer: 5-year results for local control and overall survival from the TARGIT-A randomised trial. *Lancet* 2014; 383:603–613.
- 8 Veronesi U, Orecchia R, Maisonneuve P, Viale G, Rotmensz N, Sangalli C, *et al.* Intraoperative radiotherapy versus external radiotherapy for early breast cancer (ELIOT): a randomised controlled equivalence trial. *Lancet Oncol* 2013; 14:1269–1277.
- 9 Silverstein MJ. Radical mastectomy to radical conservation (extreme oncoplasty): a revolutionary change. *J Am Coll Surg* 2016; 222:1–9.
- 10 Silverstein MJ, Savalia N, Khan S, Ryan J. Extreme oncoplasty: breast conservation for patients who need mastectomy. *Breast J* 2015; 21:52–59.
- 11 Clough KB, Lewis JS, Couturaud B, Fitoussi A, Nos C, Falcou MC. Oncoplastic techniques allow extensive resections for breast-conserving therapy of breast carcinomas. *Ann Surg* 2003; 237:26–34.
- 12 Santos Gd, Urban C. Aesthetics and quality of life after breast reconstruction. *Oncoplast Reconst Breast Surg* 2013; 47:432–433.
- 13 Calabrese C, *et al.* Immediate reconstruction with mammoplasty in conservative breast cancer treatment: long-term cosmetic results. *Osp Ital Chir Rome* 2001 7:38–46.
- 14 Nandakumar A, Rath GK, Katakai AC, *et al.* Decreased survival with mastectomy vis-a-vis breast-conserving surgery in stage II and III breast cancers: a comparative treatment effectiveness study. *J Glob Oncol* 2017; 3:304–313.
- 15 Mansfield L, Agrawal A, Cutress RI. Oncoplastic breast conserving surgery. *Gland Surg* 2013; 2:158–162.
- 16 Caruso F, Catanuto G. Outcomes of bilateral mammoplasty for early stage breast cancer. *J Sure Oncol* 2008; 14:1143–1147.
- 17 Rietjens M, Urban CA, Rey PC, Mazzarol G, Massonneuve P, Garusi C, *et al.* Long-term oncological results of breast conservative treatment with oncoplastic surgery. *Breast* 2007; 16:387–395.
- 18 Roshdy S, Hussein O, Khater A, Zuhdy M, El-Hadaad H, Farouk O, *et al.* Safety and aesthetic outcomes of therapeutic mammoplasty using medial pedicle for early breast cancer. *Breast Cancer Targets Ther* 2015; 7:173–178.