A Comparative Study between Oncoplastic Breast Surgery and Standard Conservative Surgery: Margin status and Patient Satisfaction among Egyptian Females

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ABSTRACT

Background: *The two main goals (locoregional control and cosmetic results) usually don't meet together in standard conservative breast surgery. This opens the third way in which plastic techniques were integrated with oncological procedures and termed oncoplastic breast surgery.* ***Objective:*** *The study aimed to assess the oncological safety of oncoplastic surgery especially the margin status and its impact on patient satisfaction.* ***Patients and Methods:*** *We prospectively conduct this study on 70 female patients with breast cancer, Those were partitioned into 2 equal groups: group A (35patients) who underwent standard conservative, group B (35patients) who underwent oncoplastic surgery.* ***Results:*** *The mean margin width was 16.2±7.6 mm (1.0 – 33.0 mm) in oncoplastic group versus 9.7±7.4mm (ranges 0.0–24mm) in standard group, p-value <0.001. Only one patient (2%) reported distortion in the treated breast in the oncoplastic group versus 7 patients (20%) in standard group. Nearly 94% in the oncoplastic group said that if they could choose again they will consider the same procedure versus 16 patients (45.7%) in standard group.* ***Conclusion:*** *Most likely, oncoplastic surgery open the way for challenging tumors in troublesome areas, Permitting us to have a broad resections, accordingly, adding more oncological safety without compromising the restorative results.*

Keywords: *Oncoplastic surgery, wide margins, local recurrence, oncological safety, patient satisfaction*

1. INTRODUCTION

Two fundamental difficulties are confronting breast surgeons while managing breast cancer to ensure an oncologically safe results with pleasant aesthetic outcome. In the previous decades total mastectomy was the only way to cure breast cancer [(1)]. It gives the breast surgeon a wide margins on the cost of aesthetic results and the personal satisfaction of the patient [(2)]. The possibility of conservative breast surgery was initially depicted in 1970 after Milan 1 trial [(3)]. After that, numerous trials demonstrated that the disease free survival in breast cancer is proportional in any case the sort of mastectomy whether total or partial mastectomy [(4)]. Presently, it is acknowledged that conservetive breast surgery is the standard technique in early breast cancer, and broadly utilized in DCIS and locally advanced breast cancer after neoadjvant chemotherapy[(5)].

In spite of the fact that conservative breast surgery had wide acknowledgment among breast surgeons however, the two primary targets (locoregional control and cosmetic outcome) more often don't get together[(6)]. This might be ascribed to the area of the tumor (inferior, medial, central) in the breast or large tumor in small breast [(7)]. Likewise it was observed that 20-40% of patients that have standard conservative breast surgery will have repulsive corrective procedures [(8)]. Moreover, 20-30% of cases with traditional conservative techniques have reported positive margin status [(9)], which is the principle variable influencing local recurrence [(7)].

In any case, it is hard to have free margins with consequent less local recurrence in large lesions in small to medium sized breast and in situations where more than 20% of breast volume must be resected[(10)]. Oncoplastic breast surgery (OBS), have been developed to conquer the deformities in standard conservative surgery as regards loco regional control and restorative results [(10)]. This was initially recommended by Audretsch in mid 90 [(11)]. It enlarges the possibility of protection to extensive, privately propelled lesions after neoadjvant chemotherapy with flawless restorative results along these lines enhancing the personal satisfaction [(12)].

Different procedures have been depicted in OBS going from basic glandular reshaping to advanced mammoplasty techniques and we can't disregard the bi-level classification portrayed by clough 2005 relying upon the volume extracted, level 1 for under 20% of breast volume, level 2 for 20-50% resected volume [(6)].

In this study, we evaluate the oncological safety of oncoplastic breast surgery especially the margin status in specimens retrieved by oncoplastic techniques in comparison to those excised by traditional conservative surgery and its effect on patient fulfillment.

2. PATIENTS AND METHOD

2.1. Patient selection

This planned study was conducted on 70 female patients presented to our tertiary referral breast unit at Ain Shams University hospitals with breast cancer during the period from September 2012 to August 2013. Up to our knowledge up till now no previous studies published as a comparative prospective clinical trial taking in consideration the margin width and patient satisfaction in oncoplasty versus standard conservative surgery among Egyptian females with breast cancer; it is an exploratory study, so we included 70 cases in this trial. Our patients were partitioned into 2 equal groups: group A (35patients) who underwent standard conservative surgery, group B (35patients) who underwent oncoplastic surgery.

We excluded those who needs mastectomy or palliative wide local excision, those with pT3 tumors, patients with collagen disease, patients >60 years old, those with previous breast surgeries and those who refused to participate.

We used a randomization table generated via research randomizer program plus Annex (randomization in clinical trials at www.StatMed.com).

The plan of surgical technique will be sealed in closed envelops, numbered according to the randomization tables. Packing, sealing and numbering will all be performed by one or more health care providers other than the investigator. Neither the pathologist nor the investigator will be aware whether the patient received oncoplastic surgery or standard conservative surgery (double-blinding). Randomization coding tables will be hidden from the investigator till the end of the study.

Every one of the patients sharing in the study signed an informed consent to partake in this clinical trial that was approved in a meeting held by the ethical committee on august 2012 at Ain Shams University.

The accompanying data were accounted for in all cases including age, family history, body mass index, tumor size, volume and weight of the specimen, site of the tumor, margin width, TNM staging, molecular subtype and patient satisfaction. All patients had follow-up for 3.5-4 years.

2.2 Surgical Procedure:

All cases sharing in the study were discussed by the Multidisciplinary team (M.D.T) in our breast unit and all surgeries done by the same surgical team.

In group A glandular mobilization was done with closure of the defect by opposing the glandular elements together, Wide local excision was done in 9 cases,14 patients had quadrantectomy and 12 patients had segmentectomy.

In group B Preoperative marking was done in the morning of the day of surgery, 12 patients had inferior pedicle, 5 patients had superior pedicle, 3 patients had Grissoti technique for central tumors, 8 patients had superiomedial pedicle , 2 patients with round block technique,3 patients had batwing technique for supraareolar tumors and 2 patients had myocutanous flap(LD) to fill upper outer quadrant defect. All tumors were resected with at least finger breadth far away from palpable tumor edges.

In group A SLNB was done in 18 cases with negative axilla (clinically and/or radiologically), two of them showed positive nodes with completion of axillary clearance while 17 cases had formal axillary clearance from the beginning of surgery (level 1,2).

In group B 16 patients had SLNB (3 of them had axillary completion) and 19 patients had axillary clearance from the start, Routine intraoperative clipping of the tumor bed was done in all cases.

As regard contralateral symmetrization 34 patients had surgery for the opposite breast in the oncoplastic patients (15 had inferior pedicle reduction mammoplasty, 11 had superior reduction mammoplasty and 8 patients had round block mastopexy). One patient refused surgery on the opposite breast.

A1  **A2** 

Fig. (A): 1): Preoperative marking for superiomedial pedicle for RT tumor in LIQ.
2) Final results for bilateral superomedial pedicle with contralateral symmetrization

B1  **B2** 

B3  **B4** 

Fig. (B): 1): Preoperative marking of inferior pedicle for left LIQ tumor. **2)** Deepithelization of the inferior pedicle. **3)** Fashioning of the inferior pedicle. **4)** Final results at the end of surgery.

2.3. Specimen evaluation:

All resected spicemens were labelled with silk string, then the evaluation of the volume and weight of the spicemens was done.

C1  **C2** 

Fig. (C): 1) Large resected specimen with oncoplastic technique using inferior pedicle. **2)** Show how oncoplasty gives large resected spicemen with superiomedial pedicle.

2.4. Margin assessment:

No clear definition for negative margins, In 1990 Veronesi et al. documented a higher local recurrence with clear margins less than 1 cm (13). Current UK guidelines advise a margin of 2 mm free of both invasive disease and DCIS (14). The American guidelines stated no ink on tumor as the standard for an adequate margin in invasive cancer and DCIS (15). (Int J Radiation Oncol Biol Phys, Vol. 88, No. 3, pp. 553e564, 2014), we consider in our study 2mm as safety margins. Additionally intraoperative frozen sections with touch preparation was utilized as an accurate method for margin assessment and this followed by paraffin stain for all spicemens .

2.5. Statistical Analysis

The collected data were coded, tabulated, and statistically analyzed using IBM SPSS statistics (Statistical Package for Social Sciences) software version 22.0, IBM Corp., Chicago, USA, 2013. Descriptive statistics were done for quantitative data as minimum& maximum of the range as well as mean±SD (standard deviation) for quantitative normally distributed data, while it was done for qualitative data as number and percentage. Inferential analyses were done for quantitative variables using independent t-test in cases of two independent groups with normally distributed data and. In qualitative data, inferential analyses for independent variables were done using Chi square test for differences between proportions and Fisher's Exact test for variables with small expected numbers as well as McNemar test for paired categorical data. The level of significance was taken at P value < 0.050 is significant, otherwise is non-significant.

RESULTS

3.1. Clinical results:

In group A the patients age range from (30 – 54) years old (mean44.8±5.4), while in group B the age range of (34 – 55) years old (mean43.6±6.0) with p value (0.360), family history was positive in 4 patients in group A (11.43%) and 6 patients in group B (17.1%). As regards difficult quadrants 12 patients (34.29%) in the oncoplastic group had tumors in central, UIQ and LIQ versus 9 patients in the standard group with p value (0.434), demographic data are shown in table (A).

3.2. Pathological analysis:

In group A 12 patients (34.2%) had pT1 tumors (1.5-1.9cm), 23 patients (65.7%) had pT2 tumor (range 2.3-4.5cm) , while in group B, 11 patients (31.4%) had pT1 tumors(1.4-1.8),24 patients (68.5%) had pT2 tumors (2.3-4.4cm). The axilla was node positive in 19 in the standard group (54.3%), while in oncoplastic group 21 (62.9%) patients had node positive axilla. pathological data are shown in table (A).

Specimens retrieved in standard group show mean volume161.7±88.8 cm^3 (range21.4–319.3 cm^3) while higher mean volume reported in the oncoplastic group 291.9±107.2 cm^3 (range 54.1–477.2cm^3) with significant p value <0.001 .There was a significant difference in the weight of the resected specimens in both groups (p value <0.001), with mean 123.7±43.6 gm (range21.1–222.8 gm) in standard group versus 245.5±82.4 gm (range 52.7–410.4 gm) in oncoplastic group. Different measurements of resected specimens are shown in table (B).

9 cases(25.7%) had positive margins in standard group ,In 5 cases(14%)detected by frozen section and had re-excision to achieve free margins,However it was proved by paraffin in 4 cases (11.4%) who required 2^{nd} operation for further excision.One patient (2.9%) had positive margins(detected by paraffin stain) in oncoplastic group with significant p value (0.006). Frozen section show false negative results in 4 patients (11%) in standard group and one case in oncoplastic group(3%) .The mean of margin width in group A was 9.7±7.4 mm (ranges 0.0 – 24 mm) while in group B 16.2±7.6 mm (1.0 – 33.0 mm) with significant p value<0.001.

Data of margin width shown in table (B).

Table (A): Demographic and tumor characteristics among the studied groups.

Variables		Oncoplastic (N=35)	Standard (N=35)	P
Demographic charachteristics				
Age (years)	**Mean±SD**	43.6±6.0	44.8±5.4	^0.360
	Range	34.0–55.0	30.0–54.0	
BMI (kg/m^2)	**Mean±SD**	28.2±1.6	28.2±1.1	^0.986
	Range	25.2–31.6	24.5–30.5	
Family history (n, %)		6 (17.1%)	4 (11.4%)	#0.495
Tumor charachteristics				
Pathology (n, %)	**DCIS**	4 (11.4%)	5 (14.3%)	&1.000
	IDC	29 (82.9%)	29 (82.9%)	
	ILC	2 (5.7%)	1 (2.9%)	
Grade (n, %)	**I**	5 (14.3%)	6 (17.1%)	#0.883
	II	23 (65.7%)	21 (60.0%)	
	III	7 (20.0%)	8 (22.9%)	
Difficult site		12 (34.3%)	9 (25.7%)	#0.434
Complication		3(8.57%)	2(5.7%)	0.0393
ALNC (n, %)		21 (62.9%)	19 (54.3%)	#0.467
Size (cm)	**Mean±SD**	2.9±0.7	2.7±0.8	^0.249
	Range	1.4–4.4	1.5–4.5	

Table (B): Specimen characteristics among the studied groups

Variables		Oncoplastic (N=35)	Standard (N=35)	P
Specimen charachteristics				
Volume (cm^3)	**Mean±SD**	291.9±107.2	161.7±88.8	^ **<0.001***
	Range	54.1–477.2	21.4–319.3	
Weight (gm)	**Mean±SD**	245.5±82.4	123.7±43.6	^ **<0.001***
	Range	52.7–410.4	21.1–222.8	
Safe margin width (mm)	**Mean±SD**	16.2±7.6	9.7±7.4	^ **<0.001***
	Range	1.0–33.0	0.0–24.0	
		Mean±SE	**95% CI**	
Safe margin width elevation		6.5±1.8	2.9–10.0	]

^Independent t-test, **CI:** Confidence interval, *Significant

Table (C): Negative margin frequency among the studied groups

Measures	Oncoplastic (N=35)	Standard (N=35)	#P
Negative	34 (97.1%)	26 (74.3%)	**0.006***
Positive	1 (2.9%)	9 (25.7%)	
Value of oncoplastic surgery			
Items	**Value**	**95% CI**	
Rate in oncoplastic group	97.1%	91.5%–100.0%	
Rate in WLE group	74.3%	59.8%–88.8%	
Rate elevation	22.9%	8.9%–36.8%	
Efficacy	23.6%	9.5%–37.7%	
Relative Rate	5.7	0.9–36.9	
Number needed to treat	4.4	1.5–10.9	

#Chi square test, *Significant, **CI:** Confidence interval

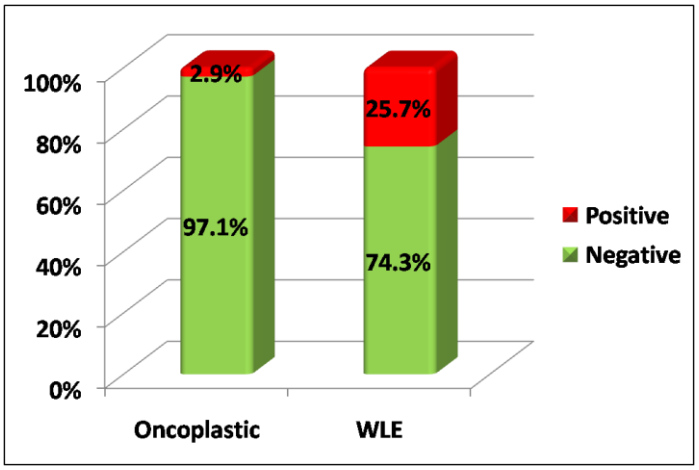

Fig. (D): Negative margin frequency among the studied groups.

3.3. Complications

We have inconveniences in 3 out 35 patients (8.57%) in the oncoplastic group, two of them developed fat necrosis, one had wound dehiscence, and the third one had superficial gangrene of nipple-areola complex and wound infection after superomedial pedicle VS two cases (5.71%) in the standard group one had wound infection and the other had postoperative hematoma and re-exploration with control of bleeding was done, higher entanglements rate reported in oncoplastic accumulate anyway it doesn't achieve noteworthy statistical p-value=0.393.Complication rate shown in table(A)

Fig. (E): A Complicated case with superficial nipple-areola gangreen with wound infection 5 days post operative after superomedial pedicle technique.

Fig. (F): Parrot beak deformty, 1 week post-operative after standard lower inner quadrantectomy.

3.4. Patient satisfaction:

All patients had questionnaire in their follow-up visit after removal of the drains, that was utilized from Chan et al.(16) who had published similar one in the World Journal of Surgery in 2010, for evaluation of their satisfaction about breast shape and body image, 31 patients (88.6%) show satisfaction about the aesthetic results in oncoplastic group versus 20(57.1%) in the standard group with significant p-value=<0.001.

In our work 7 patients (20%) in the standard conservative group reported distortion and difference in the treated breast versus only one patient (2%) in the oncoplastic group. Nearly 94% in the oncoplastic group said that if they could choose again they will consider the same procedure with no need to have further reshaping of the treated breast, in contrast to the standard group as nearly 43% will not consider another reshaping surgery with significant p value <0.001 All results of the questionnaire of both groups are shown in table (D).

Table (D): Patient satisfaction among the studied groups

Variables		Oncoplastic (N=35)	Standard (N=35)	P
Postoperative appearance	**Not satisfied**	2 (5.7%)	4 (11.4%)	**& <0.001***
	Accepted	1 (2.9%)	11 (31.4%)	
	Satisfied	31 (88.6%)	20 (57.1%)	
	Very satisified	1 (2.9%)	0 (0.0%)	
Compared to the other breast	**Seriously distorted**	0 (0.0%)	3 (8.6%)	**& 0.040***
	Very different	1 (2.9%)	4 (11.4%)	
	Some difference	28 (80.0%)	27 (77.1%)	
	Nearly identical	6 (17.1%)	1 (2.9%)	
Choosing another type	**Yes**	0 (0.0%)	7 (20.0%)	**& <0.001***
	Not certain	2 (5.7%)	12 (34.3%)	
	No	33 (94.3%)	16 (45.7%)	
Further surgery	**Yes**	1 (2.9%)	8 (22.9%)	**& <0.001***
	Not certain	1 (2.9%)	12 (34.3%)	
	No	33 (94.3%)	15 (42.9%)	

&fisher's Exact test, *Significant

4. DISSCUSION

The integration of plastic techniques in breast cancer surgery opens the way to have wide resections up to 50% of breast volume keeping nice cosmetic results with more oncological safety [(6)]. We conducted this study to evaluate how safe is oncoplastic breast surgery and its impact on patient satisfaction.

No doubt that oncoplastic tehniques permit resection of tumors in troublesome quadrants with keeping up decent restorative results, However in our study we have even distribution in difficult quadrants in both groups, this was upheld by Kaur et al. [(17)] as he reported comparative dissemination of tumor area in both groups.

On the other hand different studies showed that oncoplastic procedures utilized for troublesome tumor area instead of standard conservative breast surgery[(18,19)].

Many authors [(17)] reported that oncoplastic surgery permit broad resection giving surgeons large volume specimen with average weight (territory 200 to 1000 gm) without trading off the tasteful results, in our study we have mean volume 291.9±107.2 cm^3 in oncoplastic group, subsequently a large weighted specimen retrieved in the oncoplastic group with mean weight 245.5±82.4 gm, this outcomes run with those reported in 2013 by Down et al. as they found that the mean weight was 231 gm in oncoplastic patients VS 58 gm in qudrantectomy group with volume 484.5 cm^3 VS 112.3 cm^3 in CBS [(20)].

This is in concordance with Clough et al. who reported that the mean weight was 222 gm in 101 patients who had oncoplastic breast surgery [(18)]. Comparably Kaur et al. (17). found that the mean weight in oncoplastic group was three times than lumpectomy group (157gm VS 40 gm) with higher mean volume of 200.2 cm^3 in oncoplastic group VS 117.5 cm^3. Likewise in 2006 Losken et al. [(21)] reported 236 gm in oncoplastic group VS 64 gm in standard group.

Resection with wide margins is the objective to have lower rates of local recurrence accordingly, deficient margins implies more local recurrence [(22)]. Therefore, to accomplish this objective, broad resections are required and this will end into huge defects and disdeformed breast so no substitute of oncoplastic techniques [(22)].

As regard the margin status, we found that the mean margin width was significantly greater in the oncoplastic group(16.2±7.6 mm) in comparison to the standard group with p-value <0.001 and one case only(2.9%) showe positive margins <2mm VS 9 cases(25.7%) in the standard group, These outcomes are tantamount with different studies as In 2013 Down et al. [(20)] reported margins <5mm in 28.9% in standard group VS 5.4% in oncoplastic group with p value=0.002 with One case that had re-excision in oncoplastic group versus 18 in standard group and one had mastectomy versus 17 in standard group comparatively Mehmet Ali Gulcelik et al. [(23)]

reported 11% positive edges VS 8.4% in oncoplastic group with re-excision rate 15% in CBS group and 10.3% in OBS, re-excision rate much lower in OBS p=0.04.

Caruso et al. [24] and Kaur et al. [17] reported positive margins inside 2mm in 8%, 16.6% individually in oncoplastic patients. In Milan 2007, Ritges et al. [25] reported just 5% positive edge in 148 patients had oncoplastic surgery. André Vallejo et al. [22] discovered one case with microscopic positive margins in oncoplastic group VS 7 cases in the standard preservationist group. In 2003 Clough [18] distributed his study of 101 patients had OBS with 89% negative edges. This was upheld by Meretoja et al. [26] in 2010 on 90 patients reporting 83.8% negative margins. In 2012 Roughton et al. [27] reported just 14% with positive margins in 46 patients who had oncoplastic surgery.As regard accuracy of frozen section,We have false negative results in 5 patients(7%) and this similar to international reports about false negative data with frozen section in margin assessment in breast cancer (0-19%) [28].

Veronisi[29] reported that oncoplastic breast surgery is comparable to MRM in local recurence moreover, they had better quality of life.

In our study the follow up was short anyway, we reported one patient (2.9%) with local recurrence in the standard group 3 years in the wake of completing chemoradiation,then again no local recurrence reported in the oncoplastic group. Down et al. [20] and Roughton et al. [27] reported no local recurrence in follow-up period from 7 months – 5 years and 38 months individually, additionally Clough [18] reported 9.4% 5 year recurence rate in 101 patients and Rietjens et al. [25] had 3% local recurence in 74 months development. In substantial arrangement on 540 patients Fitoussi et al. [29] reported 6.8%, local recurrence with mean follow-up 49 months. In 2008 Caruso et al. [24] reported 1 case of local recurence (1.5%) among 63 patients with mean follow up 68 month. Occurrence of local recurrence by Losken and collegues[30] was 2% with 3.25 years development. No local recurence reported by Meretoja et al. [26] in 90 patients for middle 26 months development.

In 2010 Clough et al. [6] said that fat necrosis is significant, challenging complication in OBS due to excess undermining of skin and gland from pectoralis muscle in fatty breast. Our complication rate was slightly higher in the oncoplastic group than the standard group but with no significant statistical value. Comparably our outcomes run with those reported by Down et al. [20] that no noteworthy entanglements in the oncoplastic group (5.4% versus 2.4%) in the traditional group, On the other hand Clough et al. [17] in 2003 reported (20%) complication rate on 101 patients with 4% delay in adjuvant treatment, likewise Losken et al. (30) had 22% intricacy rate in 63 patients. This can be clarified by the overabundance of glandular mobilization, reshaping and repositioning of nipple-areola in complex oncoplastic surgery. Additionally, Munhoz et al. [31] reported that complications of oncoplastic surgery may delay adjuvant treatment.

We had contralateral symmetrisation in 34 patients (97%) in oncoplastic group. Kaur et al. [17] had contralateral surgery in 90% of patients, additionally. Munhoz et al. [31] reported that all patients experienced reduction mammoplasty had bilateral surgery and reported in 2014 (2.8%) unexpected disclosure of breast cancer in the other breast. No doubt that immediate symmetrisation of the other breast had a nice effect on the mental and cosmetic results. On the other hand, delayed symmetrisation of the other breast was favored by Fitoussi et al.[29] in his study on 540 patients.

In our study (88.6%) show satisfaction about the cosmetic results in the oncoplastic group versus (57.1%) in the standard group, this can be clarified by the decent effect of oncoplastic surgery on quality of life of the patients. This run with the outcomes reported by Chang and Colleges as they discovered 70% with fabulous result and 100% with a high degree of fulfillment from 20 patients [32] additionally Goffman [33] reported 72% gave amazing satisfaction and Losken et al. [21] show 95% as rate of fulfillment after follow up for six months.

Additionally Veronisi, A. Luni [19,3] reported that good impact of OBS on quality of life will motivate women to follow screening programs.

5. CONCLUSION

Most likely, oncoplastic surgery open the way to furnish breast specialists with numerous strategies for challenging tumors in troublesome areas, with relative vast size, permitting us to have a broad resections with wide margins, accordingly, adding more oncological safety to

routine conventional techniques without compromising the restorative results and thus better quality of life for breast cancer patients.

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REFERENCES

1. Melvin JS, NiravSavalia, Sadia Khan and Jessica R. Extreme Oncoplasty: Breast Conservation for Patients who Need Mastectomy. Breast J. 2015; 21(1): 52-59.
2. Daniel XC and Van Zee KJ. Memorial Sloan-Kettering Cancer Center: Two Decades of Experience with Ductal Carcinoma in Situ of the Breast. International Journal of Surgical Oncology, 2012.
3. Luini A, Gatti G, Zurrida S, et al. The evolution of the conservative approach to breast cancer. Breast 2007; 16: 120-129.
4. Clarke M, Collins R, Darby S, et al. Effects of radiotherapy and of differences in the extent of surgery for early breast cancer on local recurrence and 15-year survival: an overview of the randomised trials. Lancet 2005; 366: 2087.
5. Doridot V, Nos C, Aucouturier JS, Sigal-Zafrani B, Fourquet A and Clough KB. Breast-conserving therapy of breast cancer. Cancer Radiother 2004; 8: 21-8.
6. Clough KB, Kaufman GJ, Nos C, Buccimazza I and Sarfati IM. Improving breast cancer surgery: a classification and quadrant per quadrant atlas for oncoplastic surgery. Ann SurgOncol 2010; 17: 1375-91.
7. Najafi M, Salmon R and Kaviani A. Oncological Outcome of Oncoplastic Breast Surgery: A Review of the Literature. Archives of Breast Cancer 2015; 2(1): 5-14.
8. Haloua MH, Krekel NM, Winters HA, RietveldDH, Meijer S, Bloemers FW, et al. A systematic review of oncoplastic breast-conserving surgery: current weaknesses and future prospects. Ann Surg 2013; 257(4): 609-20.
9. Yang JD, Lee JW, Cho YK, Kim WW, Hwang SO, Jung JH and Park HY. Surgical techniques for personalized oncoplastic surgery in breast cancer patients with small- to moderate-sized breasts (part 2): volume replacement. J Breast Cancer 2012; 15: 7-14.
10. Rancati A, Gonzalez E, Angrigiani C, Gercovich G, Deza EG and Dorr J. Oncoplastic options in breast conservative surgery. Gland surgery 2013; 2(3): 163.
11. Audretsch W, Rezai M, Kolotas C, et al. Onco-plastic surgery: "Target" volume reduction (BCT-mastopexy), lumpectomy, reconstruction (BCT-reconstruction), and flap-supported operability in breast cancer. Second European Congress on Senology, Breast Diseases 1994: 139-57.
12. Veiga DF, Veiga-Filho J, Ribeiro LM, et al. Quality-of-life and self-esteem outcomes after oncoplastic breast-conserving surgery. PlastReconstr Surg. 2010; 125(3): 811-817.
13. Veronesi U, Volterrani F, Luini A. Quadrantectomy versus lumpectomy for small size breast cancer. Eur J Cancer 1990;26:671–3.
14. NICE. Early and Locally Advanced Breast Cancer—Diagnosis and Treatment CG80. London: NICE, 2009.
15. Moran MS, Schnitt SJ, Giuliano AE, Harris JR, Khan SA, Horton J, Klimberg S, Chavez-MacGregor M, Freedman G, Houssami N, Johnson PL. Society of Surgical Oncology–American Society for Radiation Oncology consensus guideline on margins for breast-conserving surgery with whole-breast irradiation in stages I and II invasive breast cancer. International Journal of Radiation Oncology Biology Physics. 2014; 88(3):553-64.
16. Chan SW, Cheung PS, Lam SH. Cosmetic outcome and percentage of breast volume excision in oncoplastic breast conserving surgery. World J Surg 2010; 34: 1447-1452.
17. Kaur N, Petit JY, Rietjens M, Maffini F, Luini A, Gatti G and De Lorenzi F. Comparative study of surgical margins in oncoplastic surgery and quadrantectomy in breast cancer. Annals of surgical oncology 2005; 12(7): 539-545.
18. Clough KB, Lewis JS, Couturand B, Fitoussi A, Nos C and Falcou MC. Oncoplastic techniques allow extensive resections for breast-conserving therapy of breast carcinomas. Ann Surg 2003; 237: 26-34.
19. 19.Veronesi U, Cascinelli N, Mariani L, Greco M, Saccozzi R, 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: 1227-32

20. Down SK, Jha PK, Burger A and Hussien MI. Oncological advantages of oncoplastic breast-conserving surgery in treatment of early breast cancer. Breast J 2013; 19: 56-63.
21. Losken A, Styblo TM, Carlson GW, Jones G and Amerson BJ. Management algorithm and outcome evaluation of partial mastectomy defects treated using reducation or mastopexy techniques. Ann PlastSurg 2007; 59: 235-42.
22. da Silva AV, Destro C, de Figueiredo JCB, Dias EP and Torres W. A Comparison between the Oncological Safety of Oncoplastic and Conventional Conservative Breast Surgery. J Cancer Sci Ther S 2011; 2:2.
23. Gulcelik MA, Dogan L, Yuksel M, Camlibel M, Ozaslan C, and Reis E. Comparison of outcomes of standard and oncoplastic breast-conserving surgery. Journal of breast cancer2013; 16(2): 193-197.
24. Caruso F, Catanuto G, De Meo L, Ferrara M, Gallodoro A and Petrolito E. Outcomes of et al. bilateral mammoplasty for early stage breast cancer. Eur J SurgOncol 2008; 34(10): 1143-7.
25. Rietjens M, Urban CA, Rey PC, Mazzarol G, Maisonneuve P, et al. Long-term oncological results of breast conservative treatment with oncoplastic surgery. Breast 2007; 16: 387-395
26. Meretoja TJ, Svarvar C and Jahkola TA. Outcome of on co plastic breast surgery in 90 prospective patients. Am J Surg 2010; 200(2): 224-8.
27. Roughton MC, Shenaq D, Jaskowiak N, Park JE and Song DH. Optimizing delivery of breast conservation therapy: a multidisciplinary approach to oncoplastic surgery. Ann PlastSurg 2012; 69(3): 250-5.
28. Cendan JC,Coco D,Copeland 3rd EM.Accuracy of intraoperative frozen-section analysis of breast cancer lumpectomy-bed margins. J Am Coll Surg 2005;201:194-8. 20.
29. Fitoussi AD, Berry MG, Fama F, Falcou MC, Curnier A, Couturaud B and Salmon RJ. Oncoplastic breast surgery for cancer: analysis of 540 consecutive cases [outcomes article]. Plastic and Reconstructive Surgery 2010; 125(2): 454-462.
30. Losken A, Dugal CS, Styblo TM and Carlson GW. A meta-analysis comparing breast conservation therapy alone to the oncoplastic technique. Ann PlastSurg 2014; 72: 145-149.
31. Munhoz AM, Montag E and Gemperli R. Current aspects of therapeutic reduction mammaplasty for immediate early breast cancer management: An update. World J ClinOncol 2014; 5: 1-18.
32. Chang NJ, Webber B, et al. Bilateral reduction mammoplasty in combination with lumpectomy for treatment of breast cancer inpatient swithmac-romastia, American Journal of Surgery 2004; 187(5): 647-651.
33. Goffman TE, Schneider H, Hay K, Elkins DE, Schnarrs RA and Carman C. Cosmesis with bilateral mammoreduction for conservative breast cancer treatment. Breast Journal 2005; 11(3): 195-198.