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Oncoplastic conservative surgery for breast cancer: long-term outcomes of our first ten years experience

C. CALABRESE[3,4], D. CASELLA[1,2], G. DI TARANTO[2], M. MARCASCIANO[1,2], A. KOTHARI[4], S. SORDI[3], L. BARELLINI[1], F. LO TORTO[1,2], M. TARALLO[2], A. PERRA[2], A. FAUSTO[5], D. RIBUFFO[2]

[1]Department of Oncologic and Reconstructive Breast Surgery, "Breast Unit Integrata di Livorno, Cecina, Piombino, Elba, Azienda USL Toscana nord ovest", Italy
[2]Plastic Surgery Unit, Department of Surgery "P. Valdoni", Sapienza University, Rome, Italy
[3]Oncologic and Reconstructive Surgery Breast Unit, Oncology Department, Careggi University Hospital, Florence, Italy
[4]Breast Surgery Unit, Guy's Hospital, Guy's and St. Thomas' NHS Foundation Trust, London, UK
[5]Department of Diagnostic Imaging, Azienda Ospedaliera Universitaria Senese, University Hospital of Siena, Siena, Italy

Abstract. – OBJECTIVE: The main goal of oncoplastic breast surgery (OBS) is to optimize cosmetic outcomes and reduce patient morbidity, while still providing an oncologically-safe surgical outcome and extending the target population of conservative surgery. Although the growing number of reported experiences with oncoplastic surgery, few studies account for the long-term outcomes.

PATIENTS AND METHODS: Between January 2000 and December 2010, 1024 consecutive oncoplastic surgeries were performed and prospectively included in a database. Demographic data, histological and oncological evaluation and surgical complications were recorded. The role of tumor and patients' characteristics on the development of local recurrence and metastases were assessed by multivariate analysis.

RESULTS: Median follow up was 74.2 months. The average age of patients was 56.24. In 869 patients (84.9%) an invasive tumor and in 155 (15.1%) an in situ tumor (11% DCIS and 4% LIN) was found. The average size of the tumor was 24.5 mm. A positive margin was presented in 67 (6.5%) patients. Forty patients (50%) underwent re-excision and 39 (49.4%) underwent mastectomy. The overall breast conservation rate was 96.2%. Reported complications were: 17 wound infections (1.7%); 106 hematomas (10.4%); 94 lymphorrheas (9.2%), 48 partial wound dehiscence (4.7%). Local recurrences (LR) were observed in 49 patients (4.7%). The risk of local recurrence was significantly higher in the group of patients with lymphovascular invasion and with high grade (G) ($p < 0.05$). 52 (5.07%) distant metastases were reported and the related risk was significantly higher in the group of patients with lymphovascular invasion and with negative receptors ($p < 0.05$).

CONCLUSIONS: Oncoplastic surgery provides an acceptable oncological long-term outcome and can be used to treat with conservative surgery also a selected population of patients who would had otherwise undergone mastectomy in the past.

Key Words:
Breast cancer (BC), Breast conservative surgery (BCS), Oncoplastic surgery, Oncoplasty, Breast conserving surgery, Local recurrence, Therapeutic mammoplasty.

Introduction

Immediate breast reconstruction, following breast conservative surgery (BCS), has represented a significant innovation in breast cancer treatment (BCT), founding the basis of oncoplastic approach.

The success of BCS for early-stage breast cancer is based on a merge of complete excision of the tumor with adequate oncologically-safe margins with the attempt to preserve the natural shape and appearance of the breast. Indeed clinical trials have demonstrated similar oncological outcomes and long-term survival in patients with breast cancer who underwent mastectomy or breast-conserving surgery[1,2]. These findings extended the indication for breast-conserving therapy up to 80%

Corresponding Author: Giuseppe Di Taranto, MD; e-mail: giuseppeditaranto89@gmail.com

of patients with breast cancer, owing also to recent improvements in screening modalities and neoadjuvant chemotherapy regimens[3].

Despite of reliable rate of recurrences and the purported safe oncological outcome of conservative surgeries, it has been reported that an approximate 25% of these patients experienced an unsatisfactory cosmetic results[3,4].

Oncoplastic breast surgery (OBS), following conventional mammaplasty techniques, was developed with the aim of optimizing cosmetic outcomes, reducing patient morbidity, while still providing an oncologically-safe surgical procedure and extending the target population of conservative surgery.

Over the last twenty years, the development of this new surgical approach has been extremely fast, due to the increasing attention related to the quality of life of patients[5-7]. Indeed, different studies have shown that cosmetic results, following breast surgery, can play a great influence on the final psychological outcome[8-10].

Oncoplastic techniques vary from the simple mobilization of a dermo-glandular flap to correct the defect of limited exeresis to the use of local or distant pedicle flaps to completely replace mammary volume, following mastectomy[8-10]. Although OBS presents a number of advantages over BCS, there are still some concerns regarding this approach, mainly owing to the lack of evidence on long-term safety, aesthetic and health-related quality of life outcomes.

The aim of this study is to evaluate the oncological outcome in a single-institution series of 1024 patients, who underwent breast conservative surgery, followed by an oncoplastic procedure. The study followed the ethical standards of human experimentation, according to the Declaration of Helsinki.

Patients and Methods

This study is a prospective evaluation of a single institution series of patient undergoing oncoplastic BCS.

Between January 2000 and December 2010, 1024 consecutive patients diagnosed with invasive or *in situ* breast cancer undergoing oncoplastic reconstructive surgery at our institution were included in the study. Patients with previous ipsilateral or contralateral breast cancer were excluded.

All enrolled patients underwent a full preoperative workup, including appropriate imaging, biopsy, and image-guided marker placement. Magnetic resonance (MRI) was used only when multicentricity was suspected or in case of dense breast.

Data were prospectively recorded in a database with SQTM® *("Scheda computerizzata per il controllo della Qualità del Trattamento del carcinoma Mammario software"*) software (CPO, Tourin, Italy). The following characteristics were prospectively recorded in the dataset: demographic data, age, BMI, tumour size, histological evaluation, surgical and oncological management, surgical complications, time and site of recurrence, adjuvant or neoadjuvant radiotherapy and chemotherapy data.

All the therapeutic options were discussed and decided by a multidisciplinary team, including a breast surgeon, a plastic surgeon, a pathologist, a radiologist, an oncologist, a radiotherapist and a psyco-oncologist. Oncoplastic technique was determined by patients' anatomy, preferences and tumor location. All patients were treated with an oncoplastic approach, when a significant volume excision was followed by reshaping of the breast parenchyma with volume displacement technique, accompanied by an adequate skin envelope reduction[9].

Prior to anesthesia induction, all patients were preoperatively marked sitting and in the upright position and both breasts were draped into the operative field for comparison. The patient was centered on the operating table fitting both the supine and upright position, in order to better evaluate intraoperatively an optimal reshaping and symmetry of the breast. The patient was placed with either arms extended in case of axillary surgery or with both arms at the sides if no axillary surgery was scheduled. In all cases, following skin excision oncoplastic techniques considered a full-thickness excisions of the tumor from the subcutaneous fat underlying the skin up to the pectoralis fascia. Patients had intraoperative localization with palpation and, in case of non-palpable lesions, an intraoperative radiographical evaluation was performed.

Metal clips were placed on the pectoralis muscle and lateral edges of the resection bed before closing the defect in order to guide future radiotherapy. All patient were informed about possible postoperative breast asymmetry, as a consequence of extensive resection that may result in volume asymmetry, if compared with the contralateral breast. According to patients' preferences, contralateral symmetrization was performed during the same operation.

The surgical treatment of the axilla was carried out by biopsy of the sentinel lymph nodes (BSL) or axillary dissection.

Margins were considered positive when tumor involved the margin of resection and clear if the closest margin to the excision plane was at least 2 mm. In the case of positive or not clear margins a re-excision was performed. Radiotherapy, chemotherapy and hormone therapy were administered according to oncological indications.

During the first five years, patients were followed up every 6 months by clinical examination and every 12 months by surveillance mammogram. Abnormal clinical findings were further investigated as appropriate. Since the 5th year follow up was carried out yearly.

Recurrences were documented by clinical examination, radiological tests and/or pathological assessment. Local and distant recurrence rates were the primary outcomes and were evaluated as the oncological safety outcome. Senior author (DR) revised data and outcomes.

Statistical Analysis

Multivariate COX proportional regression was used to assess the independent prognostic value of selected tumor and patients' characteristics on the development of local recurrence and metastases. Statistical analysis was performed with SPSS Statistics (SPSS Inc., Chicago, IL, USA). All tests were two-sided. *p*-values were considered statistically significant if $p < 0.005$.

Results

During the study period 1024 patients underwent oncoplastic reconstructive surgery for breast cancer. Tumor and patient characteristics are shown in Table I and Figure 1 account for histopathology.

The average age of patients was 56.24 (range 25-85, standard deviation ± 11.44). Pre-menopausal patients were 363 (35.4%).

In 511 patients (49.9%) the tumor was in the right breast. In 513 patients (50.1%) it was in the left breast. In 869 patients (84.9%) an invasive tumor and in 155 (15.1%) an *in situ* tumor (11% was DCIS and 4% was LIN) was found. The average size of the tumor determined by histopathology was 24.5 mm (range 10-60). Surgical techniques features are reported in Table II.

All patients underwent oncoplastic surgery. 360 patients (35.4%) were submitted, during the same procedure, to a contralateral symmetrization in order to avoid asymmetry following oncological surgery, with the discovering of some undiagnosed lesions in the contralateral parenchyma (Table III).

Table I. Characteristics of woman who underwent oncoplastic surgery.

	Cases (No. = 1024)	%
Age (years)		
< 35	16	1.6%
35-44	137	13.4%
45-54	355	34.7%
55-64	249	24.3%
65-74	201	19.6%
≥ 75	66	6.4%
Tumor size (mm)		
11-20	467	45.6%
21-30	428	41.8%
> 30	129	12.6%
Grading		
I	254	24.8%
II	430	42%
III	251	24.5%
Unknown	89	8.7%
Vascular invasion		
Yes	234	22.8%
No	790	77.2%
Multifocal tumors		
Yes	211	20.6%
No	813	79.4%
Surgical margins		
Negative	909	88.8%
Positive	67	6.5%
Close	48	4.7%
pN		
Nx	7	0.7%
N0	616	60%
N1mi	7	0.7%
N1a	323	31.7%
N2a	61	6%
N3a	10	0.9%
Ki 67		
≤ 16	531	44%
> 16	482	39.8%
Unknow	11	16.2%
Adjuvant chemotherapy	387	37
Neo adjuvant chemotherapy	41	4%
No chemotherapy	596	58.2%
Adjuvant hormonotherapy		
Yes	826	80.7%
No	198	19.3%
Boost radiotherapy		
Yes	456	44.5%
No	568	55.5%
Hormone receptor status		
ER and PgR positive	831	81.2%
ER and PgR negative	97	9.5%
ER and PgR not applicable	96	9.3%

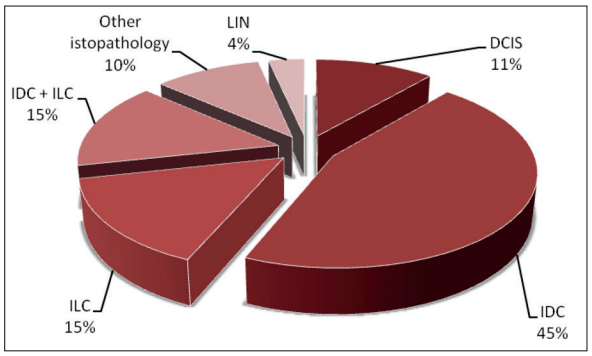

Figure 1. Distribution of Histopathology.

Table II. Techniques.

Technique	N	Percentage
Donut mastopexy	315	31%
Superior pedicle Wise Pattern	135	13%
Inferior pedicle Wise Pattern	196	19%
Grisotti	84	8%
Comma shape	114	11%
Medial pedicle mastopexy	90	9%
Lateral pedicle mastopexy	90	9%

Table III. Histological findings of contro-lateral breast.

Histopatological findings	Cases (n = 307)
Normal breast tissue	91 (29.6%)
Fibrocystic disease	73 (23.8%)
Proliferative disease with atypia	64 (20.8%)
Ductal carcinoma in situ (DCIS)	29 (9.5%)
Lobular carcinoma in situ (LCIS)	42 (13.7%)
Invasive ductal carcinoma	8 (2.6%)

Complete excision of the tumor was obtained in 909 cases (88.8%). In 115 cases margins resulted to be positive or close (11.2%). A positive margin was present in 67 (6.5%) patients. In 79 patients (7.7%) a second operation was carried out at an average time of 38.5 days from the first one (range 26-45). Forty patients (50%) underwent re-excision and 39 (49.4%) underwent mastectomy. Mastectomy was performed in case of multifocal tumor, lobular invasive cancer, linfovascular invasion or when a second conservative operation would have determined an unsatisfactory cosmetic outcome. Ten (25%) of the 40 patients who underwent a new conservative treatment presented a multifocal cancer, but no positive margins were detected at the time of second surgery.

Sentinel lymph node biopsy was carried out in 845 patients (82.5%). Complete axillary dissection was carried out in 421 patients (41.1%), 264 out of 421 as a consequence of positive sentinel lymph node.

Reported complications were: 17 wound infections (1.7%); 106 hematomas (10.4%); 94 lymphorrheas (9.2%), 48 partial wound dehiscences (4.7%) (Table IV). In 11 cases (1.07%) the complications delayed the adjuvant treatment.

Local Recurrence and Metastases

Median follow up was 74.2 months, 11 patients were lost at follow-up (1.07%).

Local recurrences (LR) were observed in 49 patients (4.7%) in an average time of 34.2 months (range 16-59) (Table V).

The risk of local recurrence was significantly higher in the group of patients with lymphovascular invasion and with high grade (G) (Table VI).

52 patients (5.07%) developed distant metastases, in an average time of 34.7 months after the first surgery (range 18-67). The metastases were localized in: bone 19, liver 9, brain 5, lung 14, multiple organs 5 (Table VII). The risk of distant metastases was significantly higher in the group of patients with lymphovascular invasion and with negative receptors (Table VI).

Seventeen patients (1.6%) died for cancer related death in an average time of 46.5 months after the first surgery (range 3-58) (Table VIII). Ten of them (58.8%) were T2 tumors, 7 patients (41.2%) were T1; 9 (52.9%) were G3, no patients were G1; 7 patients (41.2%) were ER/PgR negative and 14 patients (82.4%) had positive axillary lymph nodes; 1 patient died 3 months after surgery from a myocardial ischemia. No events were recorded in the group with DCIS.

Discussion

BCS supplemented with postoperative radiotherapy has become the standard of treatment for the majority of patients with breast cancer, with

Table IV. Complications.

	N	Percentage
Wound infection	17	1.7%
Lymphorrhea	94	9.2%
Partial wound dehiscence	48	4.7%
Hematomas	106	10.4%

Table V. Characteristics of patients with local relapse.

Patients	Age	pT	G	N	Vascular invasion	ER/PgR	Menopausal state	Margins involved	Ki67 (%)
1	40	2	2	1a	+	Pos	Pre	0	70
2	41	2	2	1	_	Neg	Pre	0	80
3	45	2	3	1	_	Neg	Pre	0	90
4	46	1C	2	0	+	Pos	Pre	0	70
5	48	1C	3	1a	+	Pos	Pre	0	80
6	50	2	3	1c	+	Pos	Pre	1	90
7	50	2	2	1c	+	Na	Post	0	90
8	53	2	2	1a	+	Pos	Post	0	80
9	54	1c	3	1a	+	Pos	Post	0	80
10	55	1C	2	1a	_	Pos	Post	0	80
11	44	2	2	1a	_	Pos	Pre	1	80
12	59	2	2	1a	+	Pos	Post	0	80
13	63	1b	3	1c	+	Neg	Post	0	85
14	41	2	2	1a	+	Pos	Pre	0	80
15	42	2	3	1c	+	Pos	Pre	0	85
16	44	2	3	1	_	Pos	Pre	0	80
17	45	1c	3	0	+	Pos	Pre	0	75
18	48	1c	3	1	+	Pos	Pre	0	70
19	49	2	2	1a	+	Pos	Pre	0	70
20	49	2	3	1	+	Pos	Pre	0	80
21	53	2	2	0	+	Pos	Post	0	90
22	57	1	3	0	_	Neg	Post	0	70
23	63	2	2	0	_	Pos	Post	0	90
24	46	2	2	2	+	Pos	Post	0	70
25	48	1b	3	1a	+	Pos	Pre	0	80
26	50	1c	3	2	+	Pos	Pre	0	75
27	50	1c	2	2a	+	Pos	Pre	0	15
28	53	1a	3	1c	+	Neg	Post	0	60
29	55	2	3	0	_	Pos	Post	0	60
30	58	2	2	1c	_	Pos	Pre	0	70
31	39	1c	3	1a	_	Pos	Pre	0	80
32	41	1c	2	1a	+	Pos	Pre	0	70
33	42	1c	3	2	+	Pos	Pre	0	60
34	43	1b	3	0	+	Pos	Pre	0	60
35	47	1c	2	2	+	Pos	Pre	0	60
36	49	1c	3	0	_	Neg	Pre	0	70
37	53	1c	2	1a	+	Pos	Post	0	40
38	53	1c	2	1a	+	Pos	Post	0	50
39	53	2	2	1	+	Pos	Pre	0	55
40	63	1c	3	1a	+	Pos	Post	0	70
41	63	1c	2	2	+	Pos	Post	0	80
42	81	1a	2	0	+	Pos	Post	0	60
43	78	2	2	0	_	Neg	Post	0	60
44	77	2	2	1	+	Pos	Post	0	70
45	62	1c	2	1c	_	Pos	Post	0	60
46	58	1c	2	1c	+	Pos	Post	0	70
47	66	1a	2	0	+	Pos	Post	0	60
48	55	1c	3	1c	+	Pos	Pre	0	70
49	49	1b	3	0	+	Pos	1	0	60

*Vascular invasion: + = Presence; – = absence **Margin involved = 0 = No; 1 = Yes.

reported survival rate similar to that of radical surgery and improved body image and health related quality of life scores[9].

BCS has not always produced good cosmetic results in all patients, promoting the growth and advancement of new techniques in breast surgery[9]. Oncoplasty was developed with the goals of providing an oncologically safe long-term outcome while fulfilling the request for an acceptable aesthetic outcome.

Oncoplasty can be integrated in every type of BCS; breast volume and appearance along

Table VI. Rates of local recurrences and metastases according to different parameters.

Characteristics	Local recurrence		Metastases	
	No. of patients	*p*	No. of patients	*p*
Overall	49		52	
Menopausal status		0.870		0.730
Pre	27		25	
Post	23		27	
Diameter of primary tumour		0.953		0.536
1-20 mm	10		30	
> 21 mm	39		22	
Grading		0.001		0.128
G1	0		1	
G2	27		30	
G3	22		21	
Axillary nodes		0.547		0.166
Involved	37		40	
Not involved	12		12	
Vascular invasion		0.000		0.001
Yes	36		29	
No	13		23	
Margins		0.423		0.939
Yes	2		0	
No	47		0	
ER/PgR		0.375		0.000
+	41		35	
–	8		17	

*Local recurrence: *p*-value is statistically significant in G and vascular invasion (df = 1; CI 95%). Metastasis: *p*-value is statistically significant in vascular invasion and receptors (df = 1; CI 95%)

with tumors' ratio and localization are the main factors that account for the choice of the proper oncoplastic technique[8-14]. As reported by different studies the relation between tumor size and breast volume has been looked as the fundamental item in determining the cosmetic result[9,15]. The percentage of breast volume excised has been associated with cosmesis and patient satisfaction outcomes[9].

Moreover, the oncoplastic reconstructive surgeon has to bear in mind the tumor location. Usatisfactory cosmetic results have been reported as a frequent occurence following the excision of tumor of the upper internal quadrant and inferior quadrants[9].

Although a growing body of reported experiences with oncoplastic surgery, few studies in literature account for the long-term outcomes of this technique. In this study we report a single centre ten years' experience about 1024 patients undergoing conservative surgery with an oncoplastic approach. The mean follow up was 74.2 months and the local recurrences rate was evaluated as low as 4.7%. These data fit in with the results already reported in literature[16-24]. The NSABP BO6 trial, the Milano 1 Trial and the Institute Curie of Paris study reported a prevalence of local recurrence (LR) of respectively 4%, 5.3% and 9.4% after five years[20-22]. In another study by De Lorenzi et al[23] the 5-year local recurrence rate was 3.2%[23]. In a series of 540 oncoplastic patients the local recurrence rate was assessed as 6.8% with a median follow up of 49 months[25]. Recently Clough et al[26] released a long-term follow-up study on a series of 350 oncoplastic reduction with a 2.2% 5-year LR rate.

In our study, a positive margin was present in 67 (6.5%) patients. This rate was lower than those reported by other studies[16-31]. In 79 patients (7.7%) a second operation was carried out: forty patients (50%) successfully underwent re-excision and 39 (49.4%) underwent mastectomy. Thus the overall breast conservation rate was 96.2%.

The conservative approach associated to oncoplastic techniques allowed us to obtain free resection margin in 89% of patients. This result suggests that oncoplastic surgery could be considered a safe approach, with decreased likeli-

Table VII. Characteristics of patients with metastasis.

Patients	Age	pT	G	pN	Vascular invasion	ER/PgR	Chemio pre	Chemio post	Hormono therapy	Menopausal state	Ki67 (%)
1	41	2	2	1	_	Neg	N	N	0	Pre	80
2	45	2	3	1	_	Neg	N	N	0	Pre	90
3	49	1c	2	2	+	Neg	N	Y	2	Post	60
4	50	2	2	1	_	Neg	N	N	0	Pre	60
5	52	2	1	0	_	Neg	N	N	0	Pre	70
6	55	1C	2	1a	_	Pos	N	Y	2	Post	80
7	44	2	2	1a	_	Pos	N	Y	1	Pre	80
8	49	4	3	3a	+	Pos	Y	Y	1	Pre	60
9	49	1c	2	0	+	Neg	N	Y	0	Pre	70
10	50	1c	3	0	_	Pos	Y	N	1	Pre	90
11	53	1c	2	0	_	Pos	N	N	1	Pre	60
12	58	1c	2	1a	+	Pos	N	Y	1	Post	70
13	59	2	2	1a	+	Pos	N	Y	1	Post	80
14	61	1b	2	1	+	Pos	N	Y	2	Post	80
15	62	1c	3	1a	+	Neg	N	Y	0	Post	75
16	63	1b	3	1c	+	Neg	N	Y	0	Post	85
17	64	2	2	1	_	Pos	N	N	1	Post	75
18	39	2	2	1	+	Pos	N	Y	1	Pre	70
19	39	1c	3	0	_	Pos	N	Y	1	Pre	80
20	42	2	3	1c	+	Pos	N	Y	1	Pre	85
21	43	1a	3	1c	_	Neg	Y	N	0	Pre	80
22	48	1c	3	0	_	Neg	N	Y	0	Pre	70
23	49	4	3	1c	_	Pos	N	Y	1	Pre	75
24	54	2	2	1c	+	Pos	N	Y	2	Post	85
25	58	2	2	2	+	Pos	N	Y	2	Post	85
26	63	2	2	0	_	Pos	N	Y	1	Post	90
27	30	2	3	1c	+	Pos	N	Y	1	Pre	70
28	46	1a	2	0	_	Pos	N	N	1	Pre	80
29	50	1b	2	1	_	Pos	Y	N	2	Post	60
30	51	2	3	1a	+	Pos	Y	N	2	Post	60
31	51	1c	3	1c	_	Pos	N	Y	1	Pre	90
32	54	2	3	2	+	Pos	N	Y	1	Pre	85
33	58	1a	3	0	_	Neg	N	Y	0	Post	75
34	58	1b	2	1a	+	Pos	N	Y	2	Post	75
35	66	2	2	1c	_	Pos	N	Y	2	Post	80
36	67	1c	3	0	_	Pos	N	N	1	Post	80
37	68	1c	2	1	_	Pos	N	Y	1	Post	75
38	40	2	2	1a	+	Neg	N	Y	0	Pre	60
39	47	1c	3	2	+	Pos	Y	N	1	Pre	70
40	51	1c	2	1c	+	Pos	N	Y	2	Post	70
41	52	1c	3	1a	+	Neg	N	Y	0	Pre	60
42	53	1c	2	1a	+	Pos	N	N	2	Post	50
43	54	1b	3	0	+	Neg	N	N	0	Pre	75
44	55	2	2	1	+	Neg	N	Y	0	Pre	75
45	56	1a	2	1c	+	Pos	N	Y	2	Post	80
46	58	1c	2	1a	+	Neg	N	Y	0	Post	80
47	68	1a	2	0	_	Pos	N	N	2	Post	75
48	71	2	3	2	+	Pos	N	N	2	Post	80
49	77	2	2	1	+	Pos	N	N	2	Pre	70
50	62	1c	2	1c	_	Pos	N	Y	2	Post	60
51	80	3	2	0	+	Pos	N	N	2	Post	80
52	38	1b	3	2	+	Neg	N	Y	0	Post	70

*Y= Yes; N = NO. **Hormonotherapy: 0 = Nothing; 1 = Tamoxifene; 2 = Aromatase inhibitor.

hood of surgical revision (7.7% in our series). Considering complications, hematoma was the most frequently observed, with 42 patients who underwent surgical revision. Only in 11 patients (1%) complications resulted in delayed adjuvant therapies.

Table VIII. Characteristics of patients' deaths.

Patients	Age	pT	G	pN	Vascular invasion	ER/Pgr	Metastasis
1	58	2	2	2		Neg	X
2	42	2	3	1c	X	Neg	X
3	63	2	2	1c		Pos	X
4	39	2	2	1	X	Pos	X
5	68	1a	2	0		Pos	
6	68	1c	3	1		Pos	X
7	51	1c	3	1c		Pos	X
8	38	1c	2	0		Pos	X
9	30	2	3	1c	X	Pos	X
10	54	2	3	2	X	Pos	X
11	51	2	3	1a	X	Pos	X
12	38	1b	3	2	X	Neg	X
13	40	2	2	1a	X	Neg	X
14	54	1b	3	1a	X	Neg	X
15	49	1c	2	0	X	Neg	X
16	44	2	2	1a		Pos	X
17	46	2	3	1c	X	Neg	X

Furthermore, when the oncological procedure would result in a serious deficiency of mammary tissue with consequent breast asymmetry, we planned a bilateral surgery[16-22], adjusting the volume of the contralateral breast. A contralateral symmetrization was carried out during the same operation, according to previous studies[27-29]. Indeed this technique, although increasing surgery time, leads to obtain excellent aesthetic results while reducing postural problems, back pain and dysfunction, strongly affecting routinely life of these patients[30-53].

Conclusions

In this study we reported our ten years caseload with oncoplastic surgery, accounting for long term outcomes of this procedure. We found that oncoplastic surgery provides an acceptable oncological outcome, even if we believe that these results must be confirmed with a longer follow-up. The oncoplastic approach allowed for the treatment with conservative surgery also that a selected population of patients who would had otherwise undergone mastectomy in the past.

Conflict of Interest

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Authors' Contribution

Claudio Calabrese: Conception and design; Administrative support; Provision of study material or patients; Collection and assembly of data; Data analysis and interpretation; Donato Casella: Conception and design; Administrative support; Provision of study material or patients; Collection and assembly of data; Data analysis and interpretation; Giuseppe Di Taranto: Collection and assembly of data; Data analysis and interpretation; Manuscript writing; Marco Marcasciano: Conception and design; Administrative support; Collection and assembly of data; Data analysis and interpretation, Ashutosh Kotari: Assembly of data; Data analysis and interpretation; Silvia Sordi: Conception and design; Administrative support; Collection and assembly of data; Data analysis and interpretation; Manuscript writing; Leonardo Barellini: Conception and design; Administrative support; Collection and assembly of data; Data analysis and interpretation; Federico Lo Torto: Conception and design; Administrative support; Provision of study material or patients; Collection and assembly of data; Mauro Tarallo: Assembly of data; Data analysis and interpretation; Administrative support; Agostino Perra: Assembly of data; Data analysis and interpretation; Alfonso Fausto: Provision of study material or patients; Assembly of data; Data analysis and interpretation; Diego Ribuffo: Conception and design; Administrative support; Collection and assembly of data; Data analysis and interpretation; Manuscript writing; n. All authors have read and approved the final manuscript.

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