REVIEW ARTICLE
DOI: 10.29289/2594539420180000320

ONCOPLASTIC SURGERY IN CONSERVATIVE SURGICAL TREATMENT OF LOCALLY ADVANCED BREAST CANCER: A SYSTEMATIC REVIEW

Cirurgia oncoplástica no tratamento cirúrgico conservador do câncer de mama localmente avançado: uma revisão sistemática

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ABSTRACT

Introdução: O tratamento cirúrgico conservador do câncer de mama se tornou o tratamento padrão por reduzir a mutilação e preservar a autoimagem corporal. Os avanços na adjuvância ampliaram as indicações para tumores maiores e novos trabalhos vêm demostrando segurança nos casos localmente avançados. **Objetivo:** Avaliar o papel da cirurgia oncoplástica no tratamento cirúrgico conservador do câncer de mama localmente avançado. **Métodos:** Revisão sistemática. Entre os 523 trabalhos encontrados na base de dados eletrônica PubMed entre 2012 e 2017 utilizando as palavras-chave "breast cancer" e "oncoplastic surgery", foram selecionados 12 trabalhos que tratavam especificamente do tema. **Resultados:** Nenhum estudo randomizado foi encontrado. As maiores séries foram retrospectivas. A média de tamanho tumoral inicial variou entre 40 e 67,0 mm. A taxa de conversão de mastectomia para tratamento conservador variou de 34 a 72,3%. Wise pattern foi a técnica mais utilizada. Foi observada maior quantidade de ressecção de tecido mamário quando a cirurgia oncoplástica foi realizada. Não foi observada diferença em relação ao comprometimento de margem quando se comparou a técnica oncoplástica com o tratamento conservador padrão. Técnicas oncoplásticas apresentaram maiores índices de complicações cirúrgicas, porém isso não acarretou atraso na adjuvância. A recorrência locorregional e a sobrevida global variaram de 0 a 14,6% e de 76,7 a 86,6%, respectivamente. Os resultados cosméticos foram considerados aceitáveis pelas pacientes em 84 a 92,3% dos casos. **Conclusões:** Técnicas cirúrgicas oncoplásticas permitem maior taxa de conservação da mama no cenário do câncer localmente avançado, sem aparente comprometimento da segurança oncológica.

PALAVRAS-CHAVE: Câncer de mama; tratamento conservador; terapia neoadjuvante; mamoplastia.

RESUMO

Introduction: Breast cancer conservative surgical treatment has become standard procedure as it reduces mutilation and preserves the body self-image. Advances in adjuvancy have increased its indications for larger tumors, and recent studies have been demonstrating its safety in locally advanced cases. **Objective:** To evaluate the role of oncoplastic surgery in the conservative surgical treatment of locally advanced breast cancer. **Method:** This is a systematic review. Out of the 523 studies found in the PubMed electronic database published between 2012 and 2017 using the keywords "breast cancer" and "oncoplastic surgery", we selected 12 that dealt specifically with the topic. **Results:** No randomized trial was found. Most series were retrospective. The average initial tumor size ranged between 40 and 67.0 mm. The conversion rate from mastectomy to conservative treatment varied from 34 to 72.3%. Wise pattern was the most used technique. Oncoplastic surgery produced a greater amount of excised breast tissue. The oncoplastic technique did not differ from the standard conservative treatment concerning positive margins. Oncoplastic techniques showed higher rates of surgical complications but did not delay adjuvancy. Locoregional recurrence and overall survival ranged from 0 to 14.6% and 76.7 to 86.6%, respectively. Patients considered the cosmetic results acceptable in 84 to 92.3% of the cases. **Conclusion:** Oncoplastic surgical techniques allow a higher rate of breast conservation in locally advanced cancer, without apparent compromise of oncological safety.

KEYWORDS: Breast cancer; conservative treatment; neoadjuvant therapy; mammaplasty.

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Conflict of interests: nothing to declare.
Received on: 12/19/2017. **Accepted on:** 06/24/2018

INTRODUCTION

When conservative surgical treatment (CST) of breast cancer was established as feasible and oncologically safe, candidates for breast preservation were patients who, at the time of diagnosis, had small lesions, < 3.0 cm (T1, T2). Prospective randomized studies confirmed that breast conservative surgery associated with radiotherapy is a safe alternative to mastectomy, which represented a paradigm shift in the treatment of breast cancer[1].

With the advances of neoadjuvant chemotherapy (CT) and targeted therapies, clinical and pathological response rates increased, and larger lesions (4.0 to 5.0 cm), which historically were treated with radical surgeries, became candidates for CST as long as the surgical specimen margins were free, and the final cosmetic result justified breast preservation[2].

CST has the advantage of reducing mutilation and improving life quality by keeping the patient's satisfaction with her body self-image. However, an acceptable esthetic result depends on tumor size, its relationship with breast volume, and its location.

Although no randomized trial that assessed the safety of breast CST included in its sample patients with locally advanced breast cancer (LABC), retrospective series have demonstrated that those with tumors larger than 5.0 cm (T3) do not have a worse outcome when compared to mastectomized patients.

Bleicher et al. found 5,685 patients with tumors larger than 5.0 cm, of whom 15.6% underwent CST, in a retrospective study of the Surveillance, Epidemiology and End Results (SEER)-Medicare database. They did not identify differences regarding overall or specific survival among patients submitted to quadrantectomy and radiotherapy when compared to those who underwent mastectomy[3].

With respect to cutaneous involvement, another American series, which evaluated 924 patients diagnosed with stage T4b breast cancer, revealed that breast tumors of this classification display a great diversity of behavior. The variables that most influence specific survival of patients with T4b cancer are tumor size and lymph node status, and not skin involvement[4].

With the advances in surgical procedures and the use of oncoplastic surgery (OPS) techniques in the treatment of breast cancer, more extensive and oncologically safe resections with good cosmetic results have been possible, and CST for LABC became a reality.

The objective of this work was to conduct a systematic literature review on CST for LABC, using OPS techniques.

MATERIALS AND METHODS

We searched the PubMed electronic database using the keywords "breast cancer" and "oncoplastic surgery", covering the period from July 15, 2012 to July 15, 2017.

The selected studies aimed at evaluating the use of OPS techniques in breast cancer CST for female patients and included LABC in their sample.

We excluded literature reviews, case reports, and studies focusing on the analysis of conventional CST.

The initial search found 523 articles, of which 134 were chosen based on their headings, according to the inclusion criteria. After perusing the abstracts, we selected 18 studies to read in full, which resulted in 12 works that met the requirements established by this systematic review methodology.

RESULTS

Methodological Characteristics

Study Design

During the article selection process, we did not find prospective randomized trials. Out of the 12 studies chosen, 3 were prospective studies, with 1 cohort and 2 non-randomized clinical trials. Among the retrospective studies, there were five cohorts, two case-controls, and two case series (Table 1).

Population and follow-up

Only one study involved two health institutions[5]; the others were based on data from a single institution.

Six studies included more than 100 subjects[6-11], and the percentage of patients diagnosed with LABC treated with OPS techniques ranged from 4 to 57% among these studies (Table 1).

No study included inflammatory carcinoma in its sample.

The series with the higher number of patients were retrospective (Table 1). Silverstein et al., in a case-control study involving 311 patients, reviewed a series of extreme oncoplastic surgeries with tumors larger than 5.0 cm[9]. Mazouni et al. compared 259 patients with indication for neoadjuvant CT who underwent breast CST with OPS techniques or conventional surgery[11]. A South-African series reviewed 251 cases of therapeutic mammaplasty, of which 64 patients underwent neoadjuvant CT for first stage regression[6].

Six studies only included patients diagnosed with LABC, with samples ranging between 42 and 119 patients[7,8,12-15]. In these studies, the percentage of use of neoadjuvant CT varied from 70 to 100% (Table 1).

Among the prospective series, the one with the highest number of patients aimed to compare the oncological outcomes of 100 patients with an initial diagnosis of LABC who underwent CST or OPS after the chemotherapy treatment[8].

The average initial tumor size ranged between 40 and 67 mm, when specified (Table 1)[7-9,11,14-16]. Clinically, the final tumor size after neoadjuvant CT was larger in patients submitted to OPS techniques when compared to those who underwent only segmental resection[8,11,16].

The mean follow-up period ranged between 18 and 86 months (Table 1).

Surgical outcomes

Conversion percentage from mastectomy to conservative treatment after neoadjuvant chemotherapy

Barranger et al. identified a conversion rate to CST of 72.3%, with 33.6% of the cases using OPS, in a retrospective study with 119 LABC patients candidates for mastectomy who underwent neoadjuvant CT[7]. Matthes et al. revealed that 34% of breast conservation procedures used some kind of OPS technique in a series of 50 cases[15].

Types of technique

Technical variations of breast remodeling through parenchyma and areola-papillary complex displacement were the most used strategies to compensate for the loss of volume caused by the quadrantectomy (21.7 to 100%) (Table 1). Among the techniques

Table 1. Characteristics of the studies.

Reference	Year	Groups	LABC + OPS n (%)	No. OPS	Oncoplastic techniques	Type of study/level of evidence	Mean age	NEO CT (%)	Follow-up (months)	Mean or Median / Initial T interval (cm)	No. of patients
Grubnik A et al.[6]	2012	OPS	10 (4)	251	WP, HB, BT, Cb, O	Retrospective cohort/3	56.3	25.5	50	ND	251
Barranger E et al.[7]	2015	1. MRM 2. (CST + OPS)	29 (33.6)	29	ND	Retrospective cohort/3	49.6	100	41.1	4.16 (1.5–11.0)	119
Broecker JS et al.[16]	2016	1. OPS 2. CST	12 (13.7)	47	OR	Retrospective cohort/3	57	100	44	1. 4.37 (0.7–11.0) 2. 2.65 (0.4–6.5)	87
Chauhan A et al.[8]	2016	1. OPS 2. CST	57 (57)	57	PA, SP, IP, GR, LD, MF, MC	Non-randomized prospective clinical trial/2	46.9	100	1. 18 2. 34	1. 5.3 (±1.2) 2. 4.9 (±1.3)	100
Bogusevicius A et al.[12]	2013	OPS	60 (100)	60	LD, SAF, GR J-plasty	Prospective cohort/2	55.8	70	86	4.8 (0–8.5)	60
Silverstein MJ et al.[9]	2015	OPS 1. T>5.0 cm 2. T<5.0 cm	66 (21.2)	66	WP, split reduction	Case-control/3	ND	ND	24	1. 6.2 2. 2.1	311
Emiroglu M et al.[13]	2014	OPS	42 (100)	28	GR, Grisotti, LD, SAF, HB, OR, MP	Retrospective cohort/3	48	76	61	ND	42
Vieira RAC et al.[14]	2016	1. OPS 2. CST	26 (33.3)	26	CQ, GR, PA, IP, SP	Case-control/3	48.7	100	67.1	1. 5.25 (±1.52) 2. 5.25 (±1.66)	78
Peled AW et al.[10]	2014	1. OPS 2. MRM + reconstruction	37 (36.6)	37	1. WP, IP 2. Reconstruction expander/ prosthesis, TRAM DIEP flap	Non-randomized prospective clinical trial/2	52.3	100	33	ND	101
Matthes AGZ et al.[15]	2012	Pts CE III + NEO CT	17 (34)	17	SSM, SP, IP, GR	Case series/4	45	100	ND	6.7 (3.0–14.0)	50
Paulinelli RR et al.[5]	2014	Geometric compensation	7 (41.1)	17	Geometric compensation	Case series/4	52.8	35	28.24	ND	17
Mazouni C et al.[11]	2013	1. OPS 2. CST	13 (5)	45	RB, IP, SP, GR, VM, ERM, CQ, RAC	Retrospective cohort/3	ND	100	46	1. 4.0 (1.0–8.0) 2. 4.0 (1.0–11.0)	259

LABC: locally advanced breast cancer; OPS: oncoplastic surgery; NEO CT: neoadjuvant chemotherapy; T: tumor size; WP: wise pattern; HB: hemibatwing; BT: batwing; Cb: combined; O: other; ND: not described; MRM: mastectomy; CST: conventional conservative surgical treatment; OR: oncoplastic reduction without specification of the technique; PA: periareolar; SP: superior pedicle; IP: inferior pedicle; GR: glandular remodeling; LD: latissimus dorsi; MF: myofascial; MC: myocutaneous; SAF: subaxillary flap; J-plasty; MP: mastopexy; CQ: central quadrantectomy; TRAM DIEP flap: transverse rectus abdominis musculocutaneous flap; Pts CE III: patients in clinical stage III; SSM: skin-sparing mastectomy; RB: round block; VM: vertical mammaplasty; ERM: external radial mammaplasty; RAC: recentralization of the areola-papillary complex.

mentioned, variations of the one used in reduction mammaplasty corresponded to 65% of all OPSs performed (Figure 1)[5-16].

In five studies, reduction mammaplasty techniques were used in all patients submitted to oncoplastic treatment (Table 1)[5,6,9,10,16].

The contralateral surgical approach varied between 23.3 to 100% in works that offered this procedure[5,6,9,10,12-14].

Less frequently, volume replacement techniques with pedicle latissimus dorsi, subaxillary, or dermoglandular flap were

Table 2. Oncological outcomes.

Reference	Number of patients	Groups	Margin involvement (%)	Mean T (cm) and weight (g) Postop. volume (cc)	LRR (%)	DFS (%)	OS (%)
Grubnik A et al.[6]	251	OPS	Close: 2 MRM: 1.59	T: 1.54 W: 237	2.2	94.6	96.4
Barranger E et al.[7]	1. 33 2. CST=57/OPS=29	1. MRM 2. (CST + OPS)	Positive: 1. 0 2. 4.3	T: 1. 2.53 2. 2.53	1. 3.03 2. 3.49	1. 59 2. 74	1. 77 2. 77
Broecker JS et al.[16]	1. 47 2. 40	1. OPS 2. CST	Positive: 1. 6 2. 8 MRM: 1. 6 2. 5	T: 1. 1.29 2. 1.54 W: 1. 152.3 2. 70.2	1. 5 2. 6	1. 85 2. 73	1. 95 2. 100
Chauhan et al.[8]	1. 57 2. 43	1. OPS 2. CST	Free 1. 95 2. 76 Close: 1. 3 2. 16 Positive 1. 2 2. 8 Growth: 1. 0 2. 2 MRM: 1. 2 2. 5	T: 1. 4.4 2. 2.3 V: 1. 187.54 2. 125.19	1. 0 (18-month follow-up) 2. 11 (34-month follow-up)	ND	ND
Bogusevicius A et al.[12]	60	OPS	Positive: 5	T: 2.95	10	61.7	76.7
Silverstein MJ et al.[9]	1. 66 2. 245	OPS 1. T>5.0 cm 2. T<5.0 cm	1. Positive: 16.7 01–0.9mm: 28.8 Growth: 9.1 MRM: 6.1 2. Positive: 4 01–09 mm: 7.8 Growth: 6.9 MRM:0.4	T: 1. 6.2 2. 2.1 W: 1. 217 2. 142	1. 1.2 2. 1.5	ND	ND
Emiroglu M et al.[13]	42	OPS	Positive: 7.1	T: 2.7 W: 198	14.6	59.6	86.6
Vieira RAC et al.[14]	1. 26 2. 52	1. OPS 2. CST	ND	T: ND W: 1. 307.40 2. 208.62	1. 11.5 2. 13.5	76.5*	60 months: 81.7 96 months: 61.5*
Peled AW et al.[10]	1. 37 2. 64	1. OPS 2. MRM + reconstruction	1. Positive: 8.1 MRM: 5.4 2. ND	ND	ND	ND	ND
Matthes AGZ et al.[15]	50	Pts CE III + NEO CT	Positive: 0	ND	ND	ND	ND
Paulinelli RR et al.[5]	17	Geometric compensation	Positive: 0	T: 4.38	0	100	ND
Mazouni C et al.[11]	1. 45 2. 214	1. OPS 2. CST	Positive: 1. 15.6 2. 14.1 Growth: 1. 2 2. 9 MRM: 1. 18 2. 24	T: 1. 1.5 2. 0 V: 1. 180 2. 98	ND	1. 92.7 2. 92.1	1. 96.2 2. 94.2

T: tumor size; W: weight; V: volume; LRR: locoregional recurrence. DFS: diseases-free survival; OS: overall survival; OPS: oncoplastic surgery; MRM: mastectomy; CST: conventional conservative surgical treatment; ND: not described; *no differences between groups; Pts CE III + NEO CT: patients in clinical stage III submitted to neoadjuvant chemotherapy; Postop.: postoperative.

also used to correct post-quadrantectomy deformities (3.8 to 55%) (Table 1)[8,11-13,15].

In a case series, Paulinelli et al. proposed a modification to the wise pattern mammaplasty technique (geometric compensation), in order to increase the indications for OPS in adverse situations – when the tumor compromises the skin in areas outside the usual preoperative drawing or resection of large dermoglandular volumes are necessary, which could undermine the pillars of mammaplasty[5].

Surgical specimen evaluation

While assessing the volume and weight of the surgical specimen, we found that the amount excised is more significant in OPS when compared to the product of a conventional segmental resection (Table 2)[6,8,11,14].

The percentage of positive margins among patients submitted to OPS ranged between 0 and 16.7% (Table 2)[5-13,15,16].

Broecker et al., in a retrospective analysis with 87 patients, found no significant difference regarding the outcome of surgical margins or the need for re-excision in patients who underwent CST versus OPS after CT[16]. In a prospective study with 100 patients, Chauhan et al. identified wider margins and lower incidence of close or positive margins in patients submitted to OPS (5 versus 24%)[8].

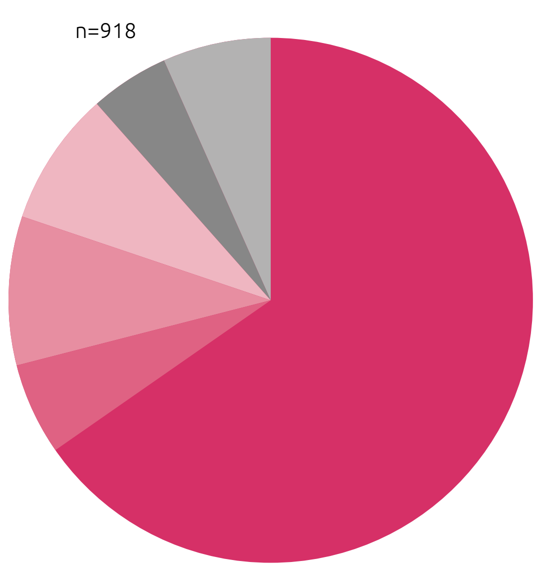

Figure 1. Oncoplastic surgery techniques used.

Silverstein et al. found free margins in 83.3% of extreme case patients treated with OPS whose tumors were larger than 5.0 cm, but the methodology did not describe the use of neoadjuvant CT. It was necessary to widen the margins in 9.1% of cases, and the conversion rate to mastectomy was 6.1%[9].

In ten studies, the conversion rate from CST using OPS techniques to mastectomy after anatomopathological results of surgical margins ranged from 0 to 6% (Table 2)[5-10,12,13,15,16]. Mazouni et al. reported 18%[11].

Anatomopathological studies of surgical specimen showed a pathological complete response rate varying from 0 to 27%[5-8,11-16]. Three studies assessed the pattern of partial response to CT and found that concentric decrease rates ranged between 46 and 52.6%, while the pattern of multifocal response varied from 15.4 to 44%[8,14,15].

Complications

Complication rates ranged from 2 to 18.9% among the studies[5,6,10-13]. They included: surgical wound infection, partial necrosis of the areola, hematoma, seroma, fat necrosis, suture dehiscence, and partial flap necrosis.

Mazouni et al. compared CST with OPS technique and identified a greater need of reoperations due to surgical complications in the group that used oncoplastic techniques for breast conservation but without adjuvant therapy delay (110 versus 119 days)[11]. Chauhan et al. found no difference in the percentage of complications (14 versus 9%; $p=0.34$)[8].

In a series of 251 therapeutic mammaplasties, Grubnik et al. detected 3.2% of early complications (before 2 months), and no patient needed reoperation. This series did not present delay at the beginning of adjuvancy, either. The late complications (20.7%) identified were more closely related to radiotherapy treatment[6].

An American prospective study that compared 101 patients with locally advanced disease submitted to radiotherapy after breast surgery revealed that the number of patients who developed complications after treatment was significantly higher among those who underwent mastectomy and immediate reconstruction when compared to candidates for breast conservative surgery associated with oncoplastic techniques (45.3 versus 18.9%; $p=0.0008$). Also, the group submitted to total breast reconstruction after mastectomy presented a higher number of non-scheduled reoperations (37.5 versus 2.7%; $p<0.0001$) and infection (35.9 versus 16.2%; $p=0.04$)[10].

Oncological outcomes

Studies comparing OPS and CST found no statistical differences regarding local recurrence, locoregional recurrence, death by disease progression, overall survival, or disease-free survival (Table 2)[11,14,16]. Chauhan et al. identified 11% of local recurrence in the group submitted to CST and none in the OPS group; however, the follow-up of the first group lasted longer (34 versus 18 months)[8].

In a 5-year follow-up, Barranger et al. found no differences with respect to local recurrence (3.49 versus 3.03%), overall survival (77 versus 77%), and disease-free survival (74 versus 59%) among LABC patients who underwent CST associated or not with oncoplasty versus mastectomy[7].

Silverstein et al., in a case-control study, compared 66 extreme case patients with tumors larger than 5 cm – classic candidates for mastectomies – who underwent OPS, and did not identify differences in local recurrence, when compared to the control group of 245 patients with tumors smaller than 5 cm submitted to OPS (1.5 versus 1.2%), in a 2-year follow-up[9].

LABC patients who underwent OPS showed locoregional recurrence rates ranging from 0 to 14.6%[7-9,12-14], and distant metastasis diagnosis, from 20.5 to 38.3%[7,12-14]. Overall survival varied from 76.7 to 86.6% among the studies (Table 2)[12-14].

Cosmetic results

Six studies sent photographic documentation of cases for analysis by specialists, who classified the final cosmetic result of OPS for breast cancer treatment as excellent, good, fair, and poor[5,6,11-13,16]. Patients also answered a satisfaction survey[6,11-13,16].

OPS results were considered acceptable (excellent, good, or fair) in 79.4 to 100% of cases, according to professional analyses[1,5,7,11]. Patient satisfaction ranged from 84 to 92.3%[1,5,7].

When comparing the end result of OPS and CST, the patients' degree of satisfaction was higher in groups submitted to oncoplastic techniques[3,12].

In a retrospective series with 251 patients submitted to therapeutic mammaplasty, of whom 220 answered a satisfaction survey, 61% reported that the appearance of the breasts improved with surgery, and 90% stated that they would choose therapeutic mammaplasty again over other surgical techniques[1].

DISCUSSION

In the past five years, numerous studies about the role of OPS in CST for LABC have been published; however, we found no randomized trial for this systematic review. Most works were retrospective, with different primary objectives (Table 1)[1-5,7,9,12]. Studies with a population consisting only of LABC patients tended to have smaller samples. A study added 8 cases of skin-sparing mastectomy to its OPS sample (17 cases)[10]. These methodological differences hindered the comparison between results. Not all studies described the radiotherapy techniques and systemic treatment, despite the influence of these factors on oncological and cosmetic outcomes[1,3,6,9,10]. Only one study had a follow-up of less than 24 months[4].

The choice of surgical treatment after neoadjuvant CT was usually left to the discretion of the surgeon, according to the evaluation of tumor response after chemotherapy and the characteristics of the breast to be operated. The studies described a large variety of breast remodeling and volume replacement surgical techniques; however, most of them showed a preference for wise pattern reduction mammaplasty (Table 1). If on the one hand, this diversity of available techniques makes the comparison between works harder, on the other, it demonstrates the variety of options to solve different adverse oncological situations since correction depends on breast volume, tumor location, and relationship deformity/breast.

In spite of OPS techniques presenting higher complication rates when compared to CST, they did not delay the start of the adjuvant treatment[6,11]. In contrast, when comparing OPS and breast reconstruction after mastectomy associated with radiotherapy, complication rates and reoperations were much higher in the second group[10]. Taking into consideration the importance of preserving the body integrity of women, even in cases of LABC, OPS increases the spectrum of surgical techniques to guarantee breast preservation and reduce complications in situations that, otherwise, mastectomy would be the only alternative.

Most comparative studies aimed to draw a parallel between CST and OPS (Table 1). The amount of excised tissue in OPS is higher compared to CST (Table 2)[6,8,11,14]. Even though recent studies indicate that it is possible to have free margins by simply not touching the India ink, and wider margins are not usually necessary, oncoplasty offers a greater potential for resection of larger tumors, without compromising esthetic results[8,11,16].

In this systematic review, positive margin rates among patients who underwent OPS ranged from 0 to 16.7%; while locoregional recurrence rates varied from 0 to 14.6% (Table 2). These data were similar to those found in the literature. Chen et al. conducted a retrospective study with 340 women (38% in stage III) submitted to neoadjuvant CT followed by conservative surgery and radiotherapy and detected 4% of positive margins and 8.5% of locoregional recurrence[17].

Only one study compared breast conservative surgery and mastectomy for LABC, detecting no differences regarding overall survival and disease-free survival[7]. These data corroborate other findings in the literature. In a meta-analysis that compared 5,500 women treated with pre and postoperative CT, Mieog et al. found no influence of the sequence of chemotherapy treatment on locoregional recurrence among patients submitted to mastectomy or conservative surgery. In the latter, they identified a decrease in mastectomy rate after neoadjuvant CT, with a relative risk of 0.71 and a confidence interval of 95% 0.67-0.75[18].

OPS cosmetic results were considered acceptable, good, or excellent in 79.4 to 100% of cases, according to professional analyses. It is noteworthy that in all 4 studies that evaluated this item, patient satisfaction with the end result exceeded the specialist's assessment (84 to 92.3%). In addition, the satisfaction of patients submitted to OPS was higher compared to those who underwent CST.

CONCLUSION

Oncoplastic techniques increase the rates of breast preservation for LABC patients, with acceptable cosmetic results, and no apparent compromise of oncological safety.

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