







AESTHETIC OUTCOME AND ONCOLOGICAL SAFETY OF NIPPLE-SPARING MASTECTOMY

Resultado estético e segurança oncológica da mastectomia poupadora do mamilo

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ABSTRACT

Background: Nipple-sparing mastectomy (NSM) has been performed for breast cancer treatment and for women at high risk. NSM provides better aesthetic outcomes; however, its oncological safety is still controversial. **Objective:** To evaluate the surgical complications, oncological safety and aesthetic satisfaction of breast cancer patients undergoing NSM with immediate breast reconstruction operated by the same medical team in a Breast Cancer Center in Brazil. **Method:** From 2004 to 2011, an aesthetic satisfaction questionnaire was administered to women undergoing NSM followed by immediate breast reconstruction 30 or 60 days after surgery. Aesthetic satisfaction, complication rates and oncological safety were analyzed. **Results:** Thirty-six breast cancer patients who underwent NSMs followed by immediate reconstruction answered the questionnaire. Most of them considered their results good (51%) or great (43%) and all patients will recommend NSM as a therapeutic treatment for other women with breast cancer. Only one patient presented infection and loss of the mammary implant, and recurrence rates were satisfactory (5.5%). **Conclusion:** Our findings showed low complication rate, oncological safety and good aesthetic outcome related to NSM with immediate reconstruction in patients from a Breast Cancer Center in Brazil. Despite the limitations of our study, we support the use of NSM with immediate reconstruction for a better aesthetic outcome with oncological safety.

KEYWORDS: breast neoplasms; esthetics; subcutaneous mastectomy; treatment outcome.

RESUMO

Introdução: A Mastectomia Poupadora do Mamilo (MPM) tem sido realizada em tratamentos de câncer de mama e em mulheres em situação de risco. A cirurgia traz melhores resultados estéticos; todavia, a sua segurança oncológica ainda é controversa. **Objetivo:** Avaliar as complicações cirúrgicas, a segurança oncológica e a satisfação estética de pacientes com câncer de mama submetendo-se à MPM com reconstrução imediata da mama operadas pela mesma equipe médica em um centro de câncer de mama no Brasil. **Método:** De 2004 a 2011, um questionário de satisfação estética foi administrado a mulheres submetidas à MPM seguida de reconstrução imediata de mama 30 ou 60 dias após a cirurgia. Foram analisadas a satisfação estética, as taxas de complicações e a segurança oncológica. **Resultados:** Trinta e seis pacientes com câncer que se submeteram a MPMs seguidas de reconstrução imediata responderam ao questionário. A sua maioria considerou os resultados bons (51%) ou ótimos (43%) e todos os pacientes recomendarão como tratamento terapêutico a outras mulheres com câncer de mama. Apenas uma paciente apresentou infecção e perda do implante mamário, e as taxas de recorrência foram satisfatórias (5,5%). **Conclusão:** Nossas descobertas mostraram baixa taxa de complicação, segurança oncológica e bom resultado estético relacionado à MPM com reconstrução imediata em pacientes de um centro de câncer de mama no Brasil. Apesar das limitações do nosso estudo, nós apoiamos o uso da MPM com reconstrução imediata para um melhor resultado estético com segurança oncológica.

PALAVRAS-CHAVE: neoplasias da mama; estética; mastectomia subcutânea; resultado do tratamento.

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INTRODUCTION

Breast cancer treatment has made a remarkable progress in the past century. Currently, the surgical treatment of the breast aims at improving the aesthetic outcome and the quality of life while still providing oncological safety. Nipple-sparing mastectomy (NSM) has been successfully performed for the treatment of early breast cancer and for women at high risk^{1,2}. The surgical technique of NSM preserves the entire skin envelope and the nipple–areola complex (NAC), allowing the immediate breast reconstruction, which confers better aesthetic results³. Despite the concerns regarding the oncological safety of NAC maintenance, current studies have reported similar locoregional recurrence rates and survival outcomes comparing NSM to skin sparing mastectomy and radical mastectomy^{4–6}.

Several studies have shown better aesthetic outcomes, increased patient satisfaction and improved quality of life associated with NSM^{7–9}. However, some authors didn't find better body image outcomes in patients undergoing NSM¹⁰. In this study, we assess the surgical complications, the oncological safety and aesthetic satisfaction of Brazilian breast cancer patients undergoing NSM with immediate breast reconstruction. Patients' characteristics and aspects of treatment that might be influencing aesthetic outcomes were also evaluated.

PATIENTS AND METHODS

This study was approved by our institutional review board. All patients in late postoperative (more than 30 days) that performed NSM with immediate reconstruction and were operated by the same medical team in a Breast Cancer Center in Brazil (CEMA-PUCRS) were invited to answer the questionnaire; patients who agreed to participate and signed an Informed Consent Form were included in our study. Between 2004 and 2011, 36 breast cancer patients who underwent NSM followed by immediate reconstruction in CEMA-PUCRS were enrolled in the study and given the aesthetic satisfaction questionnaire 30 or 60 days after surgery.

Inclusion criteria for our study included NSM for cancer treatment and risk reduction (Table 1). We collected data on patients' demographics, medical history, family history, tumor characteristics, surgical complications, oncologic and aesthetic outcomes.

Table 1. Nipple-sparing mastectomy (NSM) inclusion/exclusion criteria.

Inclusion criteria	Exclusion criteria
Unilateral or Bilateral NSM Appropriate reconstructive surgery candidate Patient undergoing immediate breast reconstruction Patient in late postoperative (more than 30 days)	Direct nipple involvement with tumor on permanent pathologic exam of a biopsy taken from the remaining major ducts in retroareolar complex Patient not undergoing immediate reconstruction

Surgical procedure

All procedures were performed under general anesthesia using a periareolar or inframammary incision. The skin incision for NSM was chosen in accordance to the main tumor location, method of reconstruction and physician consideration. Approximately 1 cm of tissue was maintained under the nipple to preserve blood flow to the NAC. Histopathological examination of retro-areolar tissue's frozen sections were performed to confirm the absence of malignancy in the retro-areolar margin. A sentinel node assessment was performed when the tumor diameter exceeded 3 cm and in case of high-grade DCIS. Immediate breast reconstruction was performed using silicon prosthetic implants or tissue expanders.

Aesthetic satisfaction questionnaire

Patient's aesthetic satisfaction with NSM outcome was assessed using a simplified questionnaire¹¹. There were no validated questionnaires for aesthetic satisfaction at the time of our study. Patients were asked two questions about their satisfaction with the procedure, and if they would recommend this surgical treatment to other breast cancer patients (Figure 1).

RESULTS

Thirty-six breast cancer patients who underwent 60 NSMs followed by immediate reconstruction operated by the same medical team in a Breast Cancer Center in Brazil were included in this study. Twelve (33.3%) patients had a unilateral NSM, while 24 (66.7%) underwent bilateral NSM. Of the 24 patients that performed bilateral NSM to treat breast cancer, 20 (83.3%) went to contralateral prophylactic surgery. Data are summarized in Table 2.

The mean patients' age was 44.2 years (+9.3, range, 23–60). Most patients were Caucasian (n=34, 94.4%) and had a partner (69.4%). The definitive histology was invasive ductal carcinoma (IDC) in 16 cases (44.5%), ductal carcinoma *in situ* (DCIS) in 7 cases (19.4%), lobular carcinoma *in situ* (LCIS) in 3 cases (8.3%), invasive lobular carcinoma (ILC) in 4 cases (11.1%) and other in the remaining cases (16.7%). Surgical margins were clear in all cases.

A small fraction of patients (11.1 %) had undergone radiotherapy before surgery to treat previous breast carcinoma, and in 11 patients (30.6%) adjuvant radiotherapy was administered. Most of these patients presented invasive ductal carcinoma (IDC) with high histologic grade and underwent radiotherapy to reduce the risk of local recurrence. All patients did transoperative anatomopathological exam of the retro-areolar border for NAC tumor investigation and none of the cases was compromised needing NAC removal. From all 36 patients, 19 were treated with chemotherapy, 3 (8.3%) with neoadjuvant chemotherapy and 16 (44.4%) with adjuvant chemotherapy. Seventeen patients (47.4%) did not receive systemic therapy. There was no delay in starting the adjuvant treatment.

All patients underwent immediate breast reconstruction. Silicone implant was used in 25 patients and a tissue expander was used in 11 patients. Patients submitted to unilateral NSM had a symmetrization on the contralateral breast. The average time between expander placement and change to definitive prosthesis was 10.2 months.

When patients were asked about aesthetic satisfaction after NSM, 51% considered a good aesthetic outcome, 43% found it great, 6% reasonable and none considered bad or terrible. All patients answered they would recommend NSM as a therapeutic treatment for women with breast cancer. Among the patients who underwent bilateral NSM (n=24), 58.3% were satisfied with the aesthetic outcome in the operated breasts. Only one patient was more satisfied with the aesthetic outcome of NSM in the breast with cancer than in the healthy breast (contralateral prophylactic surgery). All other patients were more satisfied with the aesthetic outcome of the breast that went through prophylactic surgery. This difference was statistically significant ($p < 0.001$). No significant difference in aesthetic satisfaction was found when comparing patients with a partner versus those with no partner ($p = 0.625$), patients submitted to chemotherapy versus no chemotherapy ($p = 0.503$), young patients versus old patients ($p = 0.99$), and time to fill the questionnaire (30 days versus 60 days) ($p = 0.955$).

Prophylactic antibiotics (cephalosporin) were administered for 7 days postoperative and the average time of hospitalization was 3 days. There was no case of NAC necrosis or of hematomas with drainage necessity. Only one patient (2.7%) presented infection and loss of the mammary implant.

After a mean follow-up period of 23.6 months (range, 5–46 months), two patients presented local recurrence, both in the NAC (5.5%). One of them presented Paget's disease nine months after surgery and the other presented DCIS after 12 months of follow-up. Both patients underwent NSM for DCIS treatment with no adjuvant radiotherapy. Only one patient developed distant metastasis (liver metastasis) (2.7%) with 19 months of follow-up. At the end of the follow-up period, the overall survival was 100%.

DISCUSSION

Our study assessed the complication rate, oncological safety and aesthetic satisfaction of 36 Brazilian breast cancer patients undergoing 60 NSM with immediate breast reconstruction operated by the same medical team in a Breast Cancer Center in Brazil.

Corroborating previous literature, our results showed high aesthetic satisfaction following NSM with immediate reconstruction. Systematic review evidenced that after bilateral prophylactic mastectomy, patients were satisfied with the aesthetic outcome and reported a positive body image⁷. Howard and colleagues showed high levels of aesthetic satisfaction in patients undergoing NSM for cancer treatment and risk-reducing surgery using the BREAST-Q questionnaire. Thirty-nine patients filled this questionnaire prior to surgery and 2 years after the completion of reconstruction. Patients who underwent risk-reducing NSM presented a higher overall satisfaction. However, the overall satisfaction with breasts was similar in both groups in postoperative. These results were not impacted by the occurrence

Patient satisfaction assessment questionnaire	
Nipple sparing mastectomy and immediate breast reconstruction: Breast cancer patients and high risk patients	
1. How do you classify your satisfaction with aesthetic outcome of the surgery you went through in a scale of 5 levels?	
Really bad ()	
Bad ()	
Reasonable ()	
Good ()	
Great ()	
2. Is there a difference in your satisfaction, related to the aesthetic outcome, between the right and the left breasts? If yes, which breast do you think has the best aesthetic outcome? (Only for patients that did bilateral procedure)	
Yes ()	
Right ()	
Left ()	
No ()	
3. Would you recommend this treatment to another patient?	
Yes ()	
No ()	

Figure 1. Patient satisfaction assessment questionnaire.

of complications⁸. In accordance, Bailey and colleagues demonstrated higher scores in patient aesthetic satisfaction and better outcomes in 32 breast cancer patients who underwent

Table 2. Patient's demographics.

Characteristics	NSM (%)
Number of patients	36
Mean age \pm SD, year	44.3 \pm 9.3
Race	
White	34 (94.4)
Black	1 (2.8)
Asian	1 (2.8)
Partner	
Yes	25 (69.4)
No	11 (30.6)
NSM	
Unilateral NSM	12 (33.3)
Bilateral NSM	24 (66.7)
Cancer stage	
0	10 (27.9)
I	12 (33.3)
II	12 (33.3)
III	2 (5.5)
Cancer histology	
DCIS	7 (19.4)
LCIS	3 (8.3)
IDC	16 (44.5)
IDC+DCIS	1 (2.8)
ILC	4 (11.1)
Phyllodes	1 (2.8)
Mucinous carcinoma	2 (5.5)
Tubular carcinoma	1 (2.8)
Medular carcinoma	1 (2.8)
Radiotherapy	
Previous RT	4 (11.1)
Adjuvant	11 (30.6)
None	21 (58.3)
Chemotherapy	
Neoadjuvant	3 (8.3)
Adjuvant	16 (44.5)
None	17 (47.2)
Immediate reconstruction	
Immediate implant	25 (69.4)
Immediate tissue expander	11 (30.6)

SD: standard deviation; NSM: nipple-sparing mastectomy; DCIS: ductal carcinoma in situ; LCIS: lobular carcinoma in situ; IDC: invasive ductal carcinoma; ILC: invasive lobular carcinoma; RT: Radiotherapy.

NSM compared to 32 breast cancer patients who underwent non-NSM using the BREAST-Q questionnaire⁹. More than 94% of our patients who underwent NSM with immediate reconstruction considered the aesthetic outcome good or great, and all of them would recommend the same surgical treatment for other patients with breast cancer. These findings support the aesthetic consideration of NSM's use.

Most of the NSMs performed were bilateral (66.7%); most of the patients with unilateral breast cancer underwent contralateral prophylactic NSM (70.8%). The use of bilateral NSM seems to provide a better aesthetic outcome and to reduce the risk of cancer recurrence on contralateral breast. However, the survival benefit remains unclear in the literature¹²⁻¹⁴. In agreement with our findings, several authors reported high satisfaction in patients undergoing CPM¹⁵⁻¹⁷. Most of the patients who underwent bilateral NSM (97.2%) were more satisfied with the aesthetic outcome of the breast that went through prophylactic treatment. Radiotherapy might be affecting negatively the aesthetic outcomes of the irradiated breast^{18,19}. The immediate reconstruction offers a better aesthetic outcome when radiotherapy is not performed. Radiotherapy prior or post-mastectomy induces capsule formation in 85% of patients, affecting the aesthetic outcomes²⁰.

We also analyzed factors that could be influencing on patients' aesthetic satisfaction after NSM. The presence of a partner, chemotherapy treatment, age, and different time to answer the questionnaire were not associated with the patients' aesthetic satisfaction.

Furthermore, this study presents infection with loss of mammary implant in one patient and no cases of NAC necrosis. The complication rate presented in our study was of 2.7%, which is lower compared to previous works^{1,21,22}. In NSM performed for treatment of breast cancer and risk reduction, the overall complication rate was approximately 5.3% with infection rate of 4.3%²¹.

During follow-up, NAC recurrence rate was 5.5% and systemic recurrence rate was 2.7% with no effects on overall survival. Both patients that relapsed underwent NSM for DCIS treatment with no adjuvant radiotherapy. A systematic review found a pooled local recurrence of 2.38% after a mean follow-up of 38 months (range, 7.4–156 months)²². Another study presented no cases of local recurrence and NAC recurrence in a median follow-up of 49 months²¹. An analysis of NSM from the Italian National database reported a local regional recurrence rate of 2.9% with a recurrence rate in NAC of 0.7%²³. The recurrence rates reported in our study were acceptably higher considering that we analyzed all the indications to the procedure and took into account that our analyses were based on patient numbers, and not on procedure numbers as most of the studies. The authors had no conflict of interest with this study.

There were several limitations to this study. We did not use a comparison group of mastectomy patients not having a nipple-sparing mastectomy. Our study presented a small sample size

and only patients who returned to the Breast Cancer Center of the study after 30 or 60 days post-operation and accepted to participate were selected. The questionnaire used was based in previous works; however, this instrument was not validated. In the beginning of our study, no validated aesthetic questionnaires were available. We chose to use a summary questionnaire to increase patients' adherence to our research, but the sensitivity of the instrument could be diminished.

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CONCLUSION

Our findings showed oncological safety and good aesthetic outcomes related to NSM with immediate reconstruction in patients from a Breast Cancer Center in Brazil. Complication rates were low when compared to previous literature and recurrence rates were satisfactory. Despite our study's limitations, we support the use of NSM with immediate reconstruction for better aesthetic outcomes with oncological safety.

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