Minimally invasive mastectomy: minimal incisions for better aesthetic quality of breast reconstruction

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Summary

Background: Women with a family history of breast cancer who develop this disease are confronted with important situations regarding the increased risk for development of a second cancer in the contralateral breast. Prophylactic contralateral mastectomy (PCM) reduces by approximately 95% the risk for contralateral breast cancer. In spite of an increase in indications for PCM, the technical difficulties are many regarding the accomplishment of these procedures. The aim of this study is to describe the technique of mastectomy with preservation of the nipple-areola complex and a small incision, reducing surgical difficulties and complications attributed to this technique, thus allowing better aesthetic results in breast reconstruction. *Methods:* Forty-six patients with indications for PCM (28 bilateral) were submitted to minimally invasive mastectomy from March 2005 to November 2007. A small incision in the superior pole of the areola, sufficient to pass a liposuction 4 mm cannula is made. With the help of this cannula, detachment of the skin from the gland tissue is performed. Then a 3.5 to 4.5-cm long incision in the inframammary fold is made. Glandular detachment is completed using cautery in the subglandular portion and scissors in the upper breast portion cutting the restraints left by the cannula. The mammary gland tissue is removed through this incision. *Results:* Seventy-four breasts were operated on. The resected breast mass ranged from 285 g to 475 g. All 43 patients were reconstructed with prostheses. There was no necrosis of the nipple-areola complex or of the skin. *Conclusions:* This technique is an option for cases of patients with indications for PCM.

Key words: Mastectomy; Minimally invasive; Breast cancer; Prophylactic contralateral mastectomy.

Introduction

Women with a family history of breast cancer who develop this disease are confronted with important situations regarding the initial cancer treatment and increased risk for development of a second cancer in the contralateral breast [1].

The risk for cancer in the contralateral breast in the general population of women with a history of cancer is approximately 0.7% to 1% per year, with a lifetime cumulative risk of approximately 15%. This risk significantly increases in women with BRCA1/2 mutation, with an incidence of 12% to 20% in the following five years [2, 3] and cumulative risk of 52% at the age of 70 [4].

Young women with BRCA1 alterations and less than 50 years of age at onset of breast cancer have a 40% chance of developing a second primary cancer in a 10-year follow-up [5]. These high-risk women have several options regarding management of the contralateral breast. Follow-up through screening, chemoprevention, prophylactic oophorectomy and prophylactic contralateral mastectomy (PCM) [1]. PCM reduces by approximately 95% the risk for contralateral breast cancer in women with a family and personal history of breast cancer [1].

In spite of the increased indications for prophylactic mastectomy and the emergence of mastectomy with preservation of the nipple-areola complex, the technical difficulties are many regarding the accomplishment of such procedures.

Several studies show cases of patients with indications for mastectomy and with tumors far from the nipple (more than 2 cm from the tumor border); mastectomy with skin preservation associated with negative intraoperative frozen sections of the lower portion of the nipple-areola complex offers the opportunity of conservation of the nipple-areola complex without increasing the risk of local relapse [6-9].

Another possibility in order to attempt the maintenance of the nipple-areola complex is the use of preoperative subareolar mammotomy, which has been found to be efficient when evaluating the impairment of the complex, becoming an alternative to freezing [10].

Difficulties regarding glandular detachment such as intraoperative bleeding, irregularities in the cutaneous flap which make good reconstruction quality difficult, large scars, surgical time, skin necrosis and nipple-areola complex necrosis overshadow this type of procedure.

It is important to emphasize in the cases of prophylactic mastectomy where the patient does not present cancer, as the mentioned problems related to mammary reconstruction may lead to concern on part of the medical team responsible for the surgery. A poor mammary reconstruction result may raise doubts in the patient regarding the need for such surgery.

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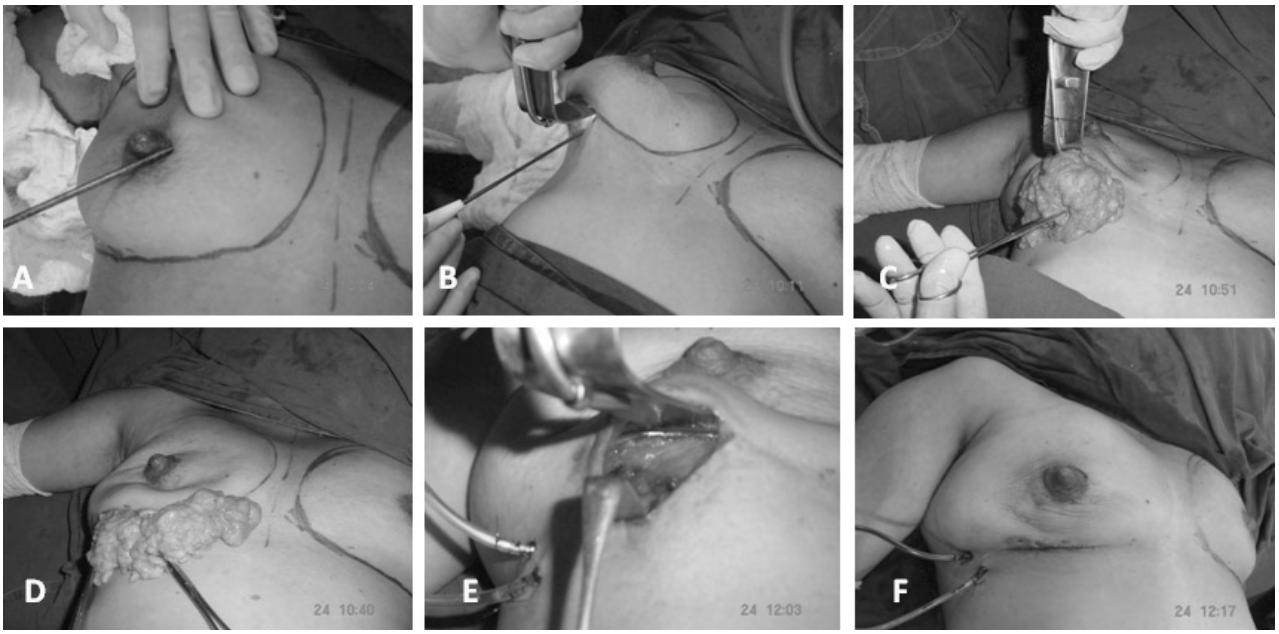

Figure 1. — A) Marking of the breast to be resected and glandular skin detachment with the help of a liposuction cannula; B) 3.5 to 4.5 cm incision in the inframammary fold and detachment of the mammary gland from the pectoral musculature; C) The mammary gland is removed through the inframammary fold incision; D) Removal of the mammary gland; E) Observation of the breast pocket after it is made; F) Visualization of the incisions performed for minimally invasive mastectomy.

The aim of this study is to describe the technique of mastectomy with preservation of the nipple-areola complex and a minimal incision, reducing surgical difficulties and complications attributed to this technique, thus allowing better aesthetic results in breast reconstruction.

Patients and Methods

Forty-six patients with indications for prophylactic adenomastectomy (28 bilateral) were submitted to minimally invasive mastectomy from March 2005 to November 2007.

Forty patients presented BRCA1+ and six BRCA2+. All cases had a positive family history (mother or sister) and cancerophobia. Ten patients were diabetic and hypertensive, four had heart disease, 14 were smokers (one pack per day) and one patient had systemic lupus erythematosus. Mean age of the patients was 34 ± 1.2 years (30-44).

Eighteen patients (39.13%) presented previous breast cancer with diagnosis by biopsy or mammotomy and stage T1N0M0. Of these tumors, 12 (66.66%) were of the ductal invasive type, four (22.22%) lobular invasive and two (11.11%) medullar. From a histochemical viewpoint, 16 patients (88.88%) were triple negative (estrogen, progesterone and HER2 receptors) and two patients (11.11%) HER2 + E- P-.

Regarding physical examination, 24 patients (52.17%) presented small breasts and 22 (48.83%) with medium hypertrophies. Six patients (13.04%) presented breasts with grade 1 Rees ptosis, 31 (73.91%) with grade 2 and six (13.04%) with grade 3.

Surgical technique

With the patient in the horizontal dorsal decubitus position, and the breast to be resected is demarcated with a marker on the skin. During this stage, it is important to observe the positioning of the intercostal arteries, noting that they are important for the maintenance of viability of the cutaneous flap (Figure 1A).

After marking, infiltration of a vasoconstrictor anesthetic solution (2% xylocaine, 1: 200,000) in the flap is performed between the skin and the gland and between the gland, and the pectoral muscle.

A small incision in the superior pole of the areola, sufficient to pass a 4 mm liposuction cannula is made. With the help of this cannula, and back and forth movements, detachment of the skin from the gland tissue is achieved (Figure 1A).

On finishing the detachment of the upper portion of the gland, a 3.5 to 4.5-cm long incision in the inframammary fold is performed, reaching the subglandular plane. Glandular detachment is completed with the help of a breast retractor using cautery in the subglandular portion and scissors in the upper breast portion cutting the restraints left by the liposuction cannula (Figure 1B). The mammary gland tissue is removed through this incision (Figures 1C-F). Drainage of all patients was done using vacuum assisted drains.

Results

Seventy-four breasts were operated on. The incision in the breast sulcus ranged from 3.8 cm to 4.9 cm (mean 4.2 cm ± 0.2 cm). The resected breast mass ranged from 285 g to 475 g (mean 350 g ± 15 g).

All 46 patients were initially reconstructed with an expander and later replaced with mammary silicone gel implants. Three and a half months was the average between the first and second time of reconstruction.

Mean time of mastectomies with preservation of the

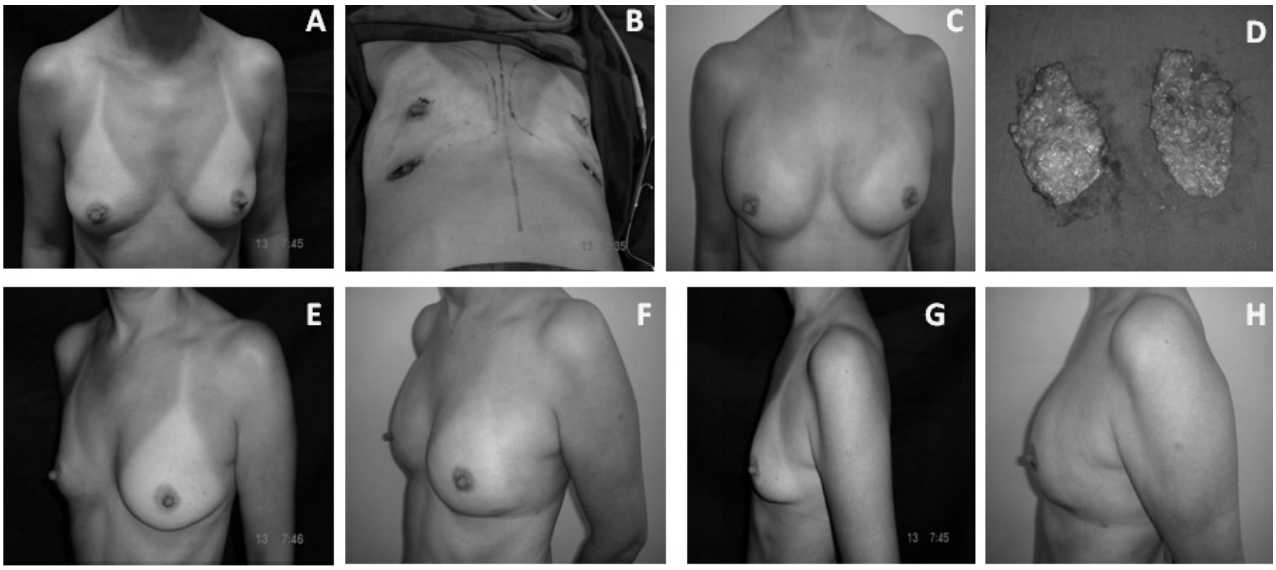

Figure 2. — A - Patient B – preoperative; B - Patient B – a small incision in the superior pole of the areola and a 3.5 to 4.5-cm long incision in the inframammary fold is performed to resect the glandula; C - Patient B – postoperative; D - The breast tissue resected; E - Patient B – preoperative; F - Patient B – postoperative 2 years; G - Patient B – preoperative; H - Patient B – postoperative 2 years.

nipple-areola complex through minimal incision was 80 minutes. During the surgical procedure bleeding was minimal. Cutaneous flaps were quite homogeneous facilitating mammary reconstruction. There was no necrosis of the nipple-areola complex or of the skin in the operated cases. Postoperative edema was considered as slight.

All surgical samples were submitted to pathology analysis. Two patients (4.34%) submitted to prophylactic mastectomy (not those who already had cancer in the preoperative period) presented breast cancer (ductal invasive, 0.7 cm and 0.8 cm, histologic grade 3, nuclear grade 3, E-, P- and HER2-). Twenty-three patients (50%) presented some degree of atypical hyperplasia of the breast. All patients were submitted to sentinel lymph node analysis which was negative for both intraoperative frozen and paraffin.

With regards to patient satisfaction for having been submitted to surgery, 32 of the patients (69.56%) considered the result of surgery good, seven (15.21%) excellent and seven (15.21%) regular (Figure 2A-H). All patients would undergo surgery again.

Discussion

The frequency of accomplishing prophylactic mastectomies is still undefined, however in the study by Perlata *et al*. [11] approximately 2.2% of all patients were submitted to this procedure between 1973 and 1998.

Studies of the Cancer Research Network demonstrated that prophylactic mastectomy not only protected against contralateral cancer development but also led to a reduction in the total mortality due to breast cancer [2].

The Society of Oncologic Surgery considers such indication for some selected patients [12]. As such, this procedure should be considered more frequently than before, thus increasing interest of bilateral prophylactic mastectomy as reported in the literature [12]. The number of these surgeries has become larger. Therefore the establishment of its role in the treatment of cancer becomes important as well as how it should be done with the least amount of sequelae.

The study by Frost *et al*. showed that, in spite of the satisfaction regarding the accomplishment of a PCM, the reduction in the level of satisfaction was associated with worsening of body appearance, complications of reconstruction after PCM when the great majority of patients did not observe favorable effects with respect to their self-esteem (83%). Problems related to femininity and sexual relationships were also observed [1].

Minimally invasive mastectomy attempts to fulfill safe surgical criteria allowing the best possible esthetic result. As any new technique, this one requires a learning curve. However, minimally invasive mastectomy with preservation of the nipple-areola complex showed to be of easy execution and easy learning. Mean time of surgery also seems to be less than the approaches by former techniques.

The resulting scar has a minimal extension and varies from 3.4 to 4.5 cm according to the size of the resected mammary gland. The determining factor for the size of the incision is not the need for a larger field for dissection and detachment of the gland but the space necessary for removal of the mammary tissue (285 g to 475 g). It is the same incision through which mammary reconstruc-

tion can be made, be it a prosthesis or an expander. In the case of a myocutaneous abdominal rectus, great dorsal or any other type of flap for reconstruction, there is maximum skin preservation, also facilitating the procedure.

Mammary reconstruction was facilitated not only by the same incision which may also be used for implant placement, but also by the fact of having more homogeneous flaps, due to detachment performed initially with the liposuction cannula and not by detachment performed with scissors and cautery.

Infiltration with vasoconstrictor solution together with liposuction cannulas (which do not impair the blood vessel) and detachment of the lower portion of the mammary gland being performed with cautery has greatly decreased bleeding in this type of procedure.

Absence of skin and nipple-areola complex necrosis is also an important factor in the attempt to use this type of approach.

In conclusion, the technique presented in this study is an option for cases of patients with indications for mastectomy with preservation of the nipple-areola complex.

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