



Implant based reconstruction in large ptotic breasts

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General Note



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ABSTRACT

Introduction: Breast reconstruction in women with large ptotic breasts is a challenging surgical procedure. Nipple sparing mastectomy is associated with increased surgical morbidity. Implant based reconstruction offers an attractive alternative in order to decrease donor site morbidity. The subpectoral pocket needs support along its inferomedial aspect. This is usually provided by acellular dermal matrix or specialized meshes. This study displays the use of a sling formed of the deepithelialised lower breast skin flap to complete the subpectoral implant pocket. **Methods:** 36 patients were included in this study, all with big sized ptotic breasts. Five patients had documented BRCA1/2 mutation and were seeking bilateral prophylactic mastectomy. 31 patients had unilateral breast cancer and underwent unilateral Wise pattern skin reducing mastectomy. Postoperative cosmetic results were evaluated using the BREAST-Q™ questionnaire and the BCCT.core ©software. **Results:** Complications occurred in 5 (14%) patients. BREAST-Q™ results showed a median score of 73.2 for overall outcome evaluation. 55.6% of the study group had a favourable cosmetic outcome

as evaluated by the BCCT.core© software. *Conclusion:* The dermal sling technique provides a valid autologous alternative to acellular dermal matrix for implant based reconstruction in patients with large ptotic breasts.

Keywords: Breast reconstruction, ptotic breasts, BCCT.core© software

1. INTRODUCTION

Implant based reconstruction is one of the most pervasive methods to restore the breast mound after mastectomy. Its prime advantage is the lack of donor site morbidities associated with autologous tissue transfer. In order to decrease implant related complications it is necessary to create a soft tissue pocket for the implant. The pectoralis major muscle has been readily used for this purpose, where the implant is put in a subpectoral pocket (Gruber et al., 1981). However, in most women there exists an anatomical discrepancy between the level of the inframammary fold and the lower limits of the pectoral pocket (origin of the pectoralis major muscle). Thus, a standard complete sub-muscular pocket has several limitations; most importantly it is difficult to produce natural ptosis or create a well-defined inframammary fold (Baker et al., 2018). The infero-medial aspect of the pectoral pocket remains deficient and is in need of expansion. The use of enhanced lower pole support with acellular dermal matrix (ADM) can overcome these challenges. However, the use of ADMs requires special considerations. The graft should be of proper size to accommodate the lower pole of the implant. Any excess ADM might lead to inversion and form a nidus for inflammation (Spear et al., 2008).

Another important aspect is that ADMs show polarity, with a dermal surface that should be facing the subcutaneous tissue and an epidermal face that should be in contact with the implant. Wrong orientation of the dermal graft can lead to cellulitis like inflammatory process. In addition the process of revascularization of the graft is hampered (Spear et al., 2008). Several authors have reported increased incidence of seroma formation and infection with ADM (Sbitany & Serletti, 2011). This study displays an alternative technique that relies on the skin of the lower pole of the breast in patients with large ptotic breasts. This skin is de-epithelialized and used as a sling to complete the subpectoral pocket for the silicone implant.

2. PATIENTS AND METHODS

This study was conducted at the Breast Surgery unit, National Cancer Institute, Cairo University, during the period from January 2017, till November 2019. Thirty six patients were included in the study; 31 patients with pathologically proven breast cancer, and 5 patients with BRCA 1/2 positive gene, for whom the procedure was done on both sides.

Inclusion criteria were patients either with pathologically proven breast cancer or BRCA positive patients:
Who are in need for mastectomy and are seeking immediate implant based reconstruction.
Who have third to fourth degree ptosis and a cup size C or more enabling adequate length of dermal sling.

Exclusion criteria were patients:

Refusing implant based or immediate reconstruction

With non ptotic small sized breasts.

Inflammatory breast cancer

Patients with tumors of the lower breast pole or with nipple areola complex infiltration were not selected for this procedure.

Patients

Four patients had medical co-morbidities (two were diabetic, one patient was hypertensive with rheumatic heart disease, and one patient had hypertension). None of the patients were smokers. Mean age of the patients was 41 years. The Body Mass Index (BMI) for the study group ranged from 29-32 Kg/m², with a mean of 31Kg/m². Seventeen patients had a cup size D, fifteen patients with a C cup size, and four patients with DD breast cup size. Twenty- eight patients of the breast cancer group received chemotherapy, eighteen in a neoadjuvant and ten in an adjuvant setting. Twenty three patients received postoperative radiation.

Methods

Full history and clinical examination was done for all patients. Metastatic work up for breast cancer cases was completed. A pre-operative counseling session by the operating surgeon was planned, where the operative procedures as well as all possible complications related to surgery were explained. Patients undergoing unilateral procedures were offered symmetrization of the contralateral breast. However, all of them refused any surgical intervention to the other breast.

On the day of surgery, markings were done in the Wise pattern fashion for skin sparing mastectomy. Preoperative pictures were taken in the anteroposterior and lateral views (Fig.1).

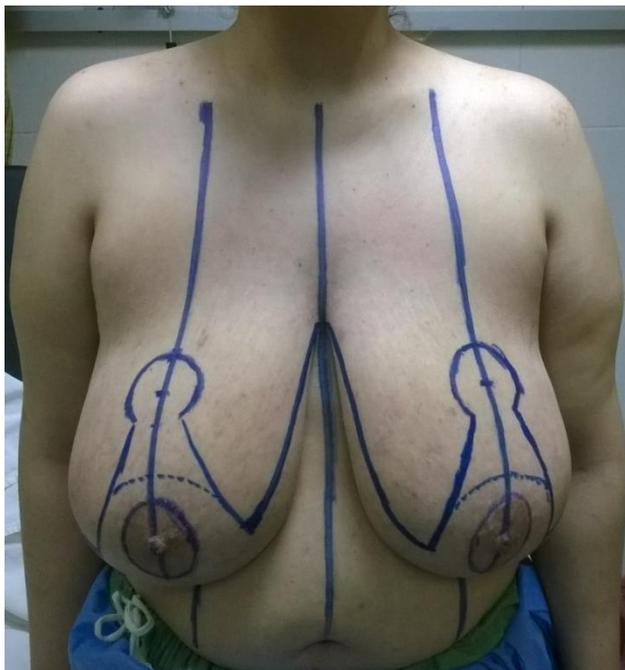


Figure 1 preoperative markings

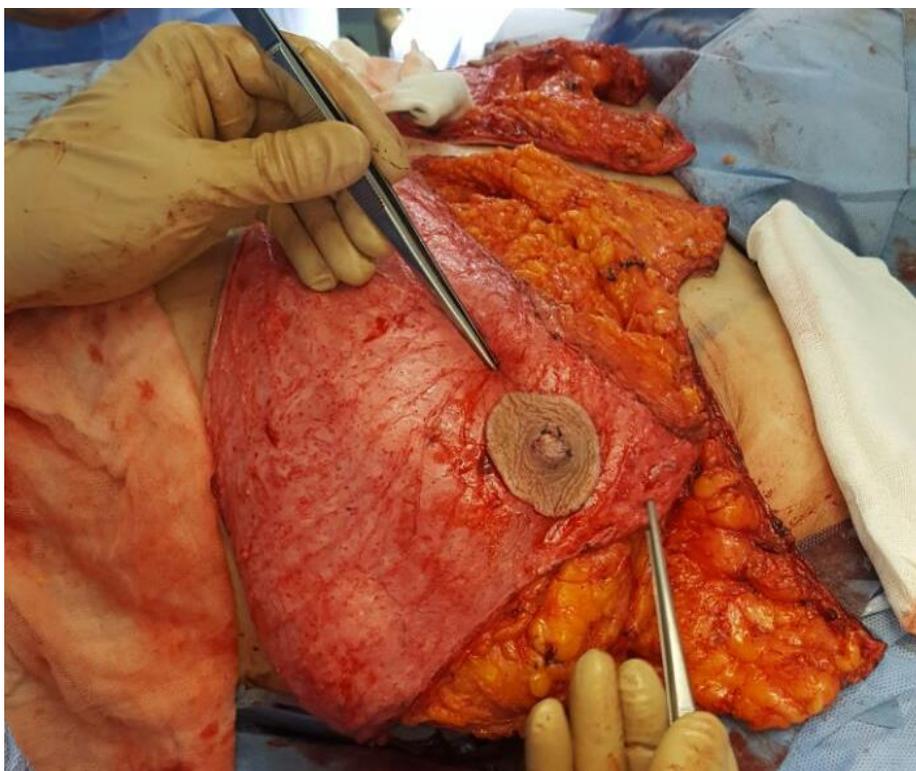


Figure 2 De-epithelialization of the lower skin flap (dermal sling) containing nipple and areola

Markings are made with the patient in the standing position. First, the midline of the patient is marked, then the two inframammary folds are drawn, with the lines extending medially to meet at the midline. The breast meridian is drawn, starting from the mid-clavicular point and passing through the center of the breast, extending till the IMF. The position of the nipple is then

determined by a (19-21cm) line drawn from the sternal notch to the breast meridian, (roughly corresponding to the level of the IMF). From the new nipple point, two lines are drawn which will eventually be sutured to form the vertical limb of the T-junction. Each line has the same length (7-9 cm) and extended to meet the level of the IMF. After this, the two lines are extended horizontally to the medial and lateral borders of the breast. These extensions indicate the position of the new IMF.

Operative technique

Single dose of third generation Cephalosporin is given on induction of anesthesia.

Patient in a supine position

The lower part of the native skin envelope of the breast is de-epithelialized, using the scalpel sparing the nipple and areola complex, which are preserved and based on the blood supply of the dermal sling (Fig 2).

Resection of the breast tissue is carried out in the same way as that of a conventional nipple or subcutaneous mastectomy procedure, in the plane between the subcutaneous fat and the breast tissue. Careful meticulous sharp dissection using scalpel or surgical scissors is resorted to during elevation of the lower flap, so as to maintain as much as possible the subcutaneous fat without breast tissue in order to ensure dermal sling viability (Fig 3).



Figure 3 Completion of subcutaneous (nipple sparing) mastectomy.

Management of the axilla follows according to the guidelines at the National Cancer Institute (Axillary Clearance, SLNB, or no intervention in cases of prophylactic mastectomy). The lower border of the pectoralis major muscle is detached from its costal origin. Dissection in a sub pectoral plane is carried up to the level of the pectoralis minor muscle origin to prevent upward displacement of implant. The dermal sling is sutured to the lower edge of the pectoralis major muscle using interrupted vicryl 3/0 sutures thus completing the pocket for the implant (Fig. 4).

The pocket is irrigated with warm saline and antibiotics. Insertion of the implant in the created sub pectoral pocket follows, under conventional precautions to decrease infection (double gloving, minimal handling of implant). In all cases, Polytech Replicon® form stable anatomical silicone implants of the textured surface type were used; sizes ranging from 350cc – 495 cc. Two suction drains are used in cases with axillary intervention; one is placed in the axilla, the other under the mastectomy skin flaps not in direct contact with the implant. In prophylactic mastectomies one drain is used. Interrupted Vicryl 3/0 sutures are used for subcutaneous tissue closure. Skin is sutured by Monocryl 4/0 subcuticular sutures. Patient is discharged within 48 hours post-

operative, and reviewed in the outpatient clinic after one week. During this visit, review of the surgical wounds and assessment of the drain output is carried out. Post-operative photos are also taken in the anteroposterior and lateral views (Fig 5).

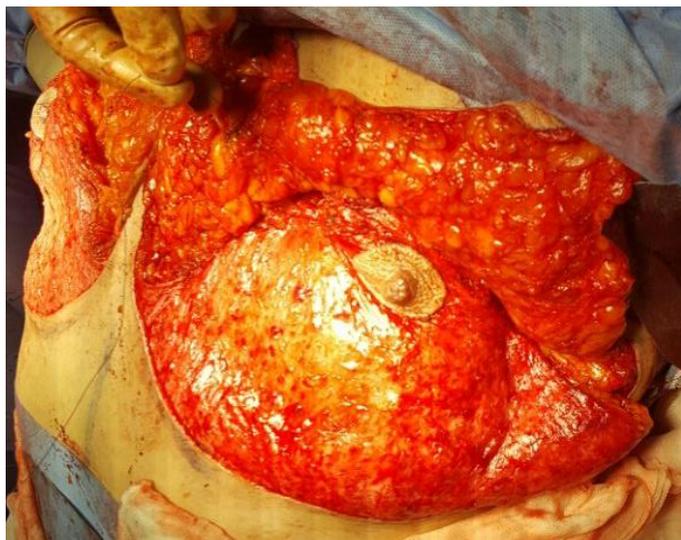


Figure 4 Dermal sling sutured to lower border of pectoralis major to complete the pocket for the implant



Figure 5 Early postoperative result

A second follow up visit is scheduled 2 weeks after the surgery. According to the pathology results, breast cancer patients are then referred to receive their adjuvant treatment. Patients scheduled for adjuvant treatment are reviewed one month post adjuvant treatment, where photos are taken, and the BREAST-Q™ is completed by the patient. Patients with prophylactic procedures are reviewed 3 months post-operative, and the BREAST-Q™ is accomplished. Patient satisfaction and quality of life in the postoperative period were determined using the BREAST-Q™ Reconstruction module (Pusic et al., 2009).

Post-operative images were assessed for cosmetic outcome evaluation using BCCT.core.3.1 software. The BCCT.core© (Breast Cancer Conservation Treatment. cosmetic results) is a program designed to simplify and standardize the evaluation of cosmetic

outcome. It is an objective tool for the quantification of the aesthetic results, discriminating between four categories (excellent, good, fair and poor) (Cardoso & Cardoso, 2007).

3. RESULTS

Average operative time was 225 minutes. Post operative complications occurred in 5 patients (14%). Wound infection occurred at the inverted T junction of the Wise pattern mastectomy wound in two patients. One patient developed superficial skin flap necrosis which was managed conservatively. Another two patients developed full thickness necrosis. One at the nipple areola complex which was completely lost. The nipple and areola complex was surgically removed and primary closure was done, however there was no implant exposure. Another patient had necrosis in the skin flaps around the vertical scar of the Wise pattern. She underwent debridement and repeated dressings and eventually healed by secondary intention.

Pathological results

31 Patients in total had primary breast cancer. Twenty-three had invasive duct carcinoma, five had invasive lobular carcinoma and three patients had ductal carcinoma in situ. Mean Tumor size for breast cancer cases was 3.2 cm. Mean lymph node harvest in cases with axillary clearance was 15 lymph nodes. Eight patients had sentinel lymph node biopsy. Five had negative results and three had a positive sentinel lymph node and completed axillary dissection. Margins were all negative and ranged from 0.3 cm to 5 cm.

Cosmetic results

All 36 patients completed the BREAST-Q™ questionnaire. The scales forming the BREAST-Q reconstruction module are: satisfaction with breasts, satisfaction with the nipple and areola, satisfaction with overall outcome, psychosocial well being, physical well being of the chest, satisfaction with information, satisfaction with the surgeon, satisfaction with the medical team and satisfaction with the office staff. The patients' responses were analyzed to obtain Q Scores using RUMM 2020 (Rasch Unidimensional Measurement Models Laboratory), a data analyzing software that transforms raw data into summary scores ranging from 0 (very dissatisfied) to 100 (very satisfied). Further categorical processing of the data was done using SAS statistical software package version 9.4 (SAS Institute Inc., Cary, N.C.). Data are expressed as the mean and standard deviation (table 1).

Table 1 The BREAST-Q results are displayed in the following

BREAST-Q scale	Q-score (SD)
Satisfaction with breasts	61.3 (10.7)
Satisfaction with nipples and areola	69.5 (13.4)
Satisfaction with outcome	73.2 (18.1)
Psychosocial well being	67.4 (15.3)
Sexual well being	49.7 (17.3)
Physical well being chest	75.1 (11.4)
Satisfaction with information	52 (19.2)
Satisfaction with the surgeon	80.4 (11.2)
Satisfaction with the medical staff	78.3 (14.5)
Satisfaction with the office staff	45 (18.9)

BCCT core software© post-operative image results were excellent in three and good in two patients of the bilateral prophylactic mastectomy group. In the 31 patients who underwent unilateral surgery, 15 were good, 13 fair, and 3 were poor (Fig 6).

4. DISCUSSION

The large ptotic breast constitutes a challenge to any reconstructive surgeon. It is difficult to restore the abnormal degrees of ptosis and breast volume without complications. The skin is usually stretched and the breast volume is usually unevenly distributed amongst the breast pole which carries risk of skin flap necrosis. Many patients of this category wish for correction of both volume and ptosis when asked about their reconstructive expectations preoperatively. Immediate implant-based reconstruction following mastectomy remains an attractive option for many women wishing to avoid the donor site morbidity associated with using autologous tissue.



Figure 6 Excellent result as evaluated by BCCT.core

In this study we display our experience to use the excess skin in the lower pole of the breast to create a sling that completes the subpectoral pocket in a way similar to the ADM. Described initially by Bostwick, single-stage reconstruction can be achieved by creating a pocket of de-epithelialized inferiorly based dermal tissue attached to the pectoralis muscle which contains a permanent implant (Dietz et al., 2012). Inferior dermal flaps have an advantage over acellular dermal matrices in that they maintain their own blood supply, thus providing an implant pocket that is fully vascularized. An inferior dermal flap with its attached subcutaneous fat also provides a thicker layer of tissue for a more natural feel (King et al., 2014). In this study, patient reported outcomes through the BREAST-Q™ questionnaire showed a considerable degree of patient satisfaction with a mean score of 73.2 for overall outcome evaluation.

Objective cosmetic evaluation through the BCCT.core© software displayed acceptable results, where 20 patients (55.6 % of study group) scored either good or excellent. This technique represents a readily available autologous option for patients with large ptotic breasts requiring implant based reconstruction; especially in settings where ADM is not obtainable.

5. CONCLUSION

The decision regarding post mastectomy reconstruction should take into consideration the patient's physical attributes and wishes. In patients with large ptotic breasts wishing for implant based reconstruction, the lower native skin flap of the breast could be used as a sling to maintain the implant in the subpectoral pocket.

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Authors' contribution

All authors contributed evenly to accomplish this research.

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Conflict of interests

The authors declare that they have no conflict of interests.

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Ethical approval for human

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee of the National Cancer Institute of Cairo University and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Data and materials availability

All data associated with this study are present in the paper and/or the Supplementary Materials.

Peer-review

External peer-review was done through double-blind method.

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