Dermal sling used in the management of breast cancer in Egyptian women with large breasts

Ahmed F. Al-Karmouty[a], Ahmad Abdel-Fattah Sabry[b]

[a]Surgery Department, Medical Research Institute, [b]Surgery Department, Faculty of Medicine, Alexandria University, Alexandria, Egypt

Correspondence to Ahmed F. Al-Karmouty, Surgery Department, Medical Research Institute, Alexandria University, Alexandria, Egypt.
e-mail: ahmadkarmouty@gmail.com

Received 19 March 2018
Accepted 3 April 2018

The Egyptian Journal of Surgery
2018, 37:384–389

Introduction
Large breast sizes are prevalent among Egyptian women. When breast reconstruction is performed in these patients, it is difficult and unsafe. Wound dehiscence leads to the risk of implant exposure. Acellular dermal matrices are expensive and infections occur.
Aim
To evaluate the safety and efficacy of the use of inferior–lateral dermal flaps to create complete pocket coverage of implants and expanders together with the pectoral muscles.
Patients and methods
Thirty patients with breast cancer underwent skin-reducing mastectomies and prostheses using the dermal slings were evaluated for technical issues and rates of postoperative complications.
Results
Early postoperative complications occurred in four patients in the form of wound dehiscence, nipple necrosis, and persistent drainage of serum for more than 2 weeks. Cases with wound dehiscence were managed by operative debridement of the edges and re-closure. Nipple loss occurred in one case; in this patient, we deflated the expander, removed the areola, and closed the gap. Cases with persistent drainage were treated conservatively. No exposure was encountered even in complicated cases.
Conclusion
Dermal slings enabled the creation of complete pocket coverage for implants and expanders, with a low complication rate. The procedure is safe and reliable. It is suitable for our patients with large breasts and major ptosis.

Keywords:
breast, dermal sling, large, reconstruction

Egyptian J Surgery 37:384–389

1110-1121

Introduction

Immediate breast reconstruction is a well-established option for early breast cancer patients who require mastectomy [1]. Implant-based reconstruction is preferred by many patients because of its simplicity, low morbidity, and lack of donor scarring [2]. Skin-sparing mastectomy yields the same oncological outcomes as radical mastectomy, with added superior cosmetic results [3]. Subpectoral implant positions are preferred to subcutaneous approaches because exposure rates are lower [4].

Skin-sparing mastectomy in small-size or medium-size breasts is a straightforward procedure. Periareolar access is well tolerated, with low exposure of implants, as they are well protected under the pectoral muscles underneath. Large breasts pose several difficulties. The skin pocket is too large to be filled by any implant size. If this excess skin is retained, the space between the surface skin and the muscle is to be filled by seroma. Again, skin irregularities occur and result in deformities.

Large breast sizes are prevalent among Egyptian women. The reason for this constitutional observation may be the effect of race and the higher incidence of reproduction and lactation in our society. Ptosis and poor skin quality add to the difficulties that plastic surgeons face when attempting to reconstruct breasts immediately after mastectomy.

Skin-reducing patterns of mastectomy lead to a three-dimensional reduction in pocket size. Reduction pattern with inverted T incision is used most widely. The inverted T design leads to the final scars in the inframammary line together with additional vertical and periareolar ones. Although too long compared with other patterns, they are hidden and not remarkable [5].

Skin-reducing mastectomy tailors the skin to the implant pocket and leaves no space for seromas or deformities. However, these patterns lead to healing difficulties and the risk of exposure. The lower breast area is particularly important in this respect. The pectoral muscle coverage is lacking in the lower areas, whereas most of the inverted T pattern scars are made in the same areas. The T junction of Wise incisions is the most common site of dehiscence in reduction operations. Failure of healing is typical in these sites. Dehiscence along the lower incisions leads to the risk of exposure and implant loss.

Acellular dermal matrix sheets are used frequently in breast reconstruction nowadays. They aid lower implant coverage by incorporating bovine or porcine dermis that is treated synthetically to lose antigenicity; they are sutured to the lower edge of pectoral muscles and then to the inframammary line. These sheets are expensive and zoonotic transfer of infection is not uncommon [6].

The lower breast skin is well vascularized. Surgeons have relied on lower skin flaps for adequate healing in radical mastectomy operations for a long time. Retaining these flaps intact in skin-reducing mastectomy may be useful. Instead of resecting the lower skin portions according to the Wise pattern, they may be simply de-epithelialized and used as 'dermal slings' to cover the lower parts of the implants.

In this series, we examined the adequacy of dermal slings in reducing the rate of implant exposure and the overall management issues related to their use for immediate implant-based reconstruction in patients with large breasts.

Patients and methods

Thirty consecutive patients were admitted to the Medical Research Institute and the Main University Hospitals of Alexandria University.

They all had a diagnosis of early breast cancer (patients with a primary diagnosis of breast carcinoma stages 0, I, and II according to AJCC classification system 2010).

The reason for mastectomy was the presence of multiple tumors in the majority of cases. Other reasons included the preference of the patients, small breasts in relation to the size of the tumor, extensive microcalcifications, or extensive in-situ components Table 1.

The cases evaluated had large cup sizes and major ptosis.

The drawing design for skin-reducing mastectomy was marked on the patients before they were transported to the operating theatre. The patient was instructed to remain in the upright standing position bore to the waist, with their back against the wall and their the shoulders should not be elevated and both of them must be at the same level. The midline, infra mammary lines, and breast meridians were marked.

The position of the upper part of the new periareolar window was marked on the meridian at the same level as the infra mammary line (point A). The two pillars were marked tangential to the existing areolar margins. The length of the pillars was approximately between 10 and 12 cm according to the size of the breast. The larger the size of the breast, the longer the length of the pillars. Inferior wings were created by joining the lower limit of the pillars (point B and C) down to the beginning and the end of the inframammary line (Fig. 1).

This area of lower skin was retained and was marked off the rest of the dermal sling.

A small triangular area at the center of the infra-mammary line, where it meets the breast meridian, this area of the lower skin were retained and marked off the dermal sling Tumor sites were marked on the surface of the breast with the patient lying in the supine position. Any skin resection was planned on the basis of the previous design.

Table 1 Causes of mastectomy

Causes of mastectomy	*n* (%)
Patient preference for mastectomy	5 (16.7)
Mmultiple epsilateral tumors	21 (70)
Small breasts	2 (6.7)
Extensive microcalcifications	1 (3.3)
Extensive in-situ component	1 (3.3)
Total	30 (100)

Figure 1

Drawings for skin-reducing mastectomy.

The patients were operated in the supine position with their arms perpendicular to their body. In cases with negative axilla, 2 ml of methylene blue 1% was injected peritumorally just after the insertion of an anesthetic tube. Massage was performed for 20 min. A cookie cutter of 4 cm diameter was used to mark the areola. Incisions were performed around the areola, at both the pillars, the infra-mammary line, between points B and the beginning of the infra-mammary line, and between points C and the end of this line.

The area between the pillars and the inframammary line was completely de-epithelialized, except for the marked areola and a small triangular area at the center of the infra-mammary line at the breast meridian (Fig. 2).

A deep incision was created half of a centimeter distance below the line that joined the beginning of the inframammary line, point B, point C, and the end of the inframammary line.

The dermal sling was created by dissection of the lower skin flap at the level of the anterior lamella (Fig. 3).

Similarly, the upper skin flap was dissected at the same level, including the nipple and the areola. Care was exercised so that the flaps were not so thin as to compromise blood supply.

Mastectomy was completed by dissecting the breast off the pectoral fascia. A small retroareolar biopsy was performed by the attending pathologist for frozen section analysis to confirm from the absence of malignant cells. The areola was removed if the retroareolar biopsy showed infiltration by tumor cells.

Sentinel lymph node biopsy was performed for patients with negative axilla through the same incision. Otherwise, level I and II axillary lymph node dissection was performed.

The pectoral muscle was dissected off the chest wall beginning at the inframammary line and along the sternal origin of the muscle. The dissection was performed laterally to separate pectoral major from minor muscles. The dissection was not performed too high. At the same level, the fascia over the serratus anterior was dissected off the muscle laterally up to the posterior axillary line. In this way, the upper part of the implant pocket was created. After careful hemostasis, suction drains were inserted to drain the pockets deep and superficial to the pectoral major muscle. In cases with negative sentinel lymph node biopsy, a suitable-sized high-profile implant was inserted deep into the dissected pectoral muscle. In patients in whom the lymph nodes were positive, a mammary expander was inserted for postoperative radiotherapy.

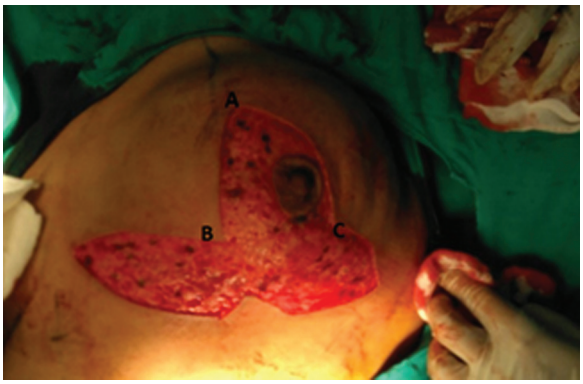
The upper part of the dermal sling was then sutured to the lower edges of the pectoral major flap and serratus facia to create a complete pocket that covered the prosthesis entirely (Fig. 4).

The upper skin flap covered the muscular–dermal pocket and joined the inframammary line in an inverted T pattern just as in reduction mammoplasty.

The nipple was transferred to its new location by a rotation of the superior–medial pedicle created by separating lateral attachments off the lateral pillars. The pedicle was at least 2 cm thick and retained its base along all the medial attachments to the medial pillars.

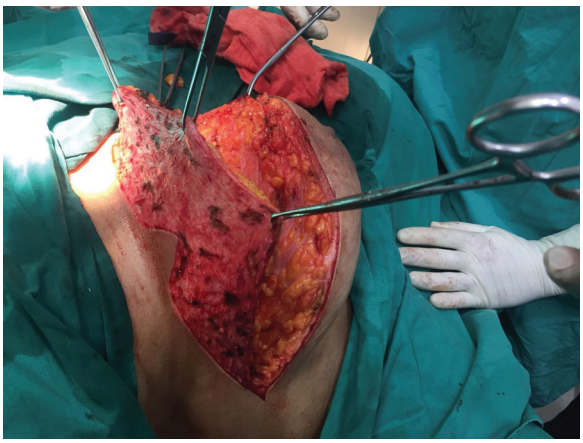
An additional drain was inserted into the axilla if axillary dissection was performed.

Figure 2



De-epithelialized areas for skin-reducing mastectomy.

Figure 3



Dermal sling dissected off the breast tissue.

Results

All patients showed a smooth recovery. They all left the hospital on the day of the operation. Drains were removed 7–10 days thereafter. Postoperative pain rarely required opioids and was managed with nonsteroidal drugs.

Early postoperative complications occurred in the form of wound dehiscence (Fig. 5), nipple necrosis (Fig. 6), and persistent drainage of serum for more than 2 weeks.

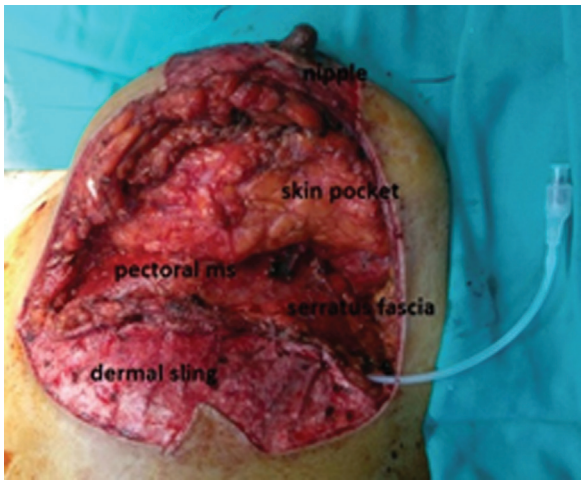
The cause of nipple necrosis in this case was the thin dermal flap carrying the nipple–areola complex. This was avoided in later cases. Wound dehiscence occurred because of wound infection (Table 2).

Cases with wound dehiscence were managed by the administration of antibiotics, followed by operative debridement of the edges and re-closure. Nipple loss occurred in one patient, in whom we deflated the expander, removed the areola, and closed the gap. Cases with persistent drainage were treated conservatively.

No exposure was encountered even in complicated cases.

The patients who had positive sentinel nodes, those in whom a mammary expander was inserted, the expander was inflated with saline solution to the maximum capacity. These patients completed their chemotherapy sessions within 6 months. During this period, no deflation of the expander occurred and the full volume was retained. Just before radiotherapy planning, all expanders were deflated entirely. The patients received full courses of external beam radiation to the chest wall with flat chests. One to three months later, the expander was removed and a moderate profile implant was inserted (Fig. 7).

Figure 4



Complete pocket created by dermal sling, pectoral muscle, and serratus fascia to cover the prosthesis.

Discussion

Immediate reconstruction of a large ptotic breast is not an easy task. The skin quality is rarely good. The vascularity of the nipple is affected. Skin reduction compromises its vitality. Underfilling causes seroma and may lead to deformity. Implant reconstruction requires adequate soft tissue coverage to be safe and durable.

Figure 5

Wound dehiscence at the lower horizontal limb.

Figure 6

Complete nipple–areola necrosis.

Table 2 Complications of dermal sling-assisted breast reconstruction

Complications	*n* (%)
Wound dehiscence	1 (3.3)
NAC necrosis	1 (3.3)
Persistent drainage of serum >2 weeks	2 (6.6)
Total	4 (13.3)

NAC, nipple-areola-complex.

Figure 7

Results of skin-reducing mastectomy and reconstruction by prosthesis.

Dermal slings utilize the otherwise expendable lower skin into a complete implant pocket with secure lower attachments. The advantages of using autologous patient viable tissues exceed acellular dermal matrixs and other synthetic options. They are also lower in cost.

Goyal *et al.* [7] evaluated 21 patients who underwent 28 dermal sling-assisted breast-reconstruction procedures. Their median age was 48 years (range: 30–70). The most common postoperative complication was superficial T-junction breakdown in five patients, and seroma and infection in three patients, but no implant removal was required. The results of our study are similar.

Sarmah *et al.* [8] reported on the use of a 'pure' dermal sling to cover implants using the same Wise pattern in two cases. The large breasts in these patients provided total coverage for implants that were positioned anterior to the pectoral muscles. There was no need for pectoral muscles dissection.

Roy [9] reported on the use of an inferolateral dermal sling in three patients with small-size and medium-size breasts who underwent skin-sparing mastectomy and enabled the use of implant sizes between 320 and 375, with low complication rates and good cosmetic outcomes.

King [10] reported on his experience on a series of 16 patients who underwent 19 skin-reducing mastectomies with dermal flaps and nipple grafts. No implant exposure was encountered and nipple grafts survived. In our series, we used a superior–medial dermal pedicle, with nipple loss only in one case.

Conclusion

Dermal slings enabled the creation of complete pocket coverage for implants and expanders, with a low complication rate. The procedure is safe and reliable. It is suitable for patients with large breasts and major ptosis.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1 Schmauss D, Machens HG, Harder Y. Breast reconstruction after mastectomy. Front Surg 2015; 2:71.

2 Kaya B, Serel S. Breast reconstruction. Exp Oncol 2013; 35:280–286.

3 González EG, Rancati AO. Skin sparing mastectomy. Gland Surg 2015; 4:541–553.

4 Bernini M, Calabrese C, Cecconi L, Santi C, Gjondedaj U, Roselli J, *et al.* Subcutaneous direct-to-implant breast reconstruction: surgical, functional, and aesthetic results after long-term follow-up. Plast Reconstr Surg Glob Open 2015; 3:e574.

5 Vita RD, Pozzi M, Zoccali G, Costantini M, Gullo P, Buccheri EM, Varanese A. Skin-reducing mastectomy and immediate breast reconstruction in patients with macromastia. J Exp Clin Cancer Res 2015; 34:120.

6 Macadam SA, Lennox PA. Acellular dermal matrices: use in reconstructive and aesthetic breast surgery. Can J Plast Surg 2012; 20:75–89.

7 Goyal A, Wu JM, Chandran VP, Reed MW. Outcome after autologous dermal sling-assisted immediate breast reconstruction. Br J Surg 2011; 98:1267–1272.

8 Sarmah P, Abbott N, Bright-Thoma R. A pure dermal sling for implant reconstruction after mastectomy in the generous breast. Ann R Coll Surg Engl 2012; 94:364.

9 Roy PG. Modified lower pole autologous dermal sling for implant reconstruction in women undergoing immediate breast reconstruction after mastectomy. Int J Breast Cancer 2016; 2016:9301061.

10 King IC, Harvey JR, Bhaskar P. One-stage breast reconstruction using the inferior dermal flap, implant, and free nipple graft. Aesthetic Plast Surg 2014; 38:358–364.