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Breast

Meshed Dermal Sling for Prepectoral Breast Reconstruction

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Summary: The best breast reconstruction solution after mastectomy remains a topic of wide debate. Recently, the focus in the field of implant-based reconstruction has been on the increasing indications for prepectoral reconstruction. This offers undoubted advantages over subpectoral reconstruction, ranging from better aesthetic results and patient comfort to a less invasive procedure that spares the pectoralis major muscle, reducing pain and postoperative recovery time. The dermal sling is a reconstructive variant introduced by Bostwick in the 1990s and is commonly used to complete the subpectoral pocket in one- or two-stage reconstruction, creating a dual-plane reconstruction. This method may be indicated after mastectomy for both therapeutic and prophylactic purposes. It can also be used for unilateral and bilateral reconstructions. We propose a new meshed dermal sling technique that allows complete prepectoral reconstruction without the use of acellular dermal matrix, thus reducing the cost of reconstruction. It also allows the indication for complete prepectoral reconstruction to be extended to patients with medium breast volume and grade 1 or 2 ptosis, without the need to use acellular dermal matrix or the pectoralis major muscle to complete the breast pocket.
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INTRODUCTION

Dermal sling (DS) is a dermal flap used to cover breast implants with two layers of tissue in immediate reconstruction after a type IV skin-sparing mastectomy (Wise pattern mastectomy).[1] It was described by Bostwick in 1990.[2] DS has similar function to an acellular dermal matrix, allowing greater control in creation of pocket and inframammary fold, without using a heterologous material. DS has been reported in the literature as a useful reconstructive method in patients with medium-to-large volumes and ptotic breasts.[3,4] It forms a layer of vascularized tissue that provides additional protection for the implant.[3,5] However, it remains controversial whether DS, especially the distal part, can be considered a flap or a graft. We consider DS a flap in the part proximal to inframammary fold that should not be thinned too much during de-epithelialization. This will ensure its vascularization and its protective function at the inverted T-junction. After mastectomy, the most distal portion of the dermal flap will have a limited vascularization with a higher risk of liponecrosis. Therefore, it is thinned to act as a graft and to facilitate adhesion and revascularization.

However, DS is not well suited to fully cover a prepectoral implant reconstruction in medium-sized breasts using a traditional technique. We present a new technique, developed by senior author F. T., which allowed us to perform a complete prepectoral reconstruction. Exclusion criteria to proceed with DS were uncompensated diabetes mellitus, body mass index greater than 30, heavy smokers (>20 cigarettes/d), previous radiotherapy, or previous reconstructive failure with implants. No cases of partial implant coverage with DS were included in the study.

PROCEDURE

The first phase consists of mastectomy incisions (skin-sparing or nipple-sparing Wise pattern with dermal superomedial pedicle) (Fig. 1) and, if indicated, the posterior biopsy of the nipple-areolar complex (NAC) together

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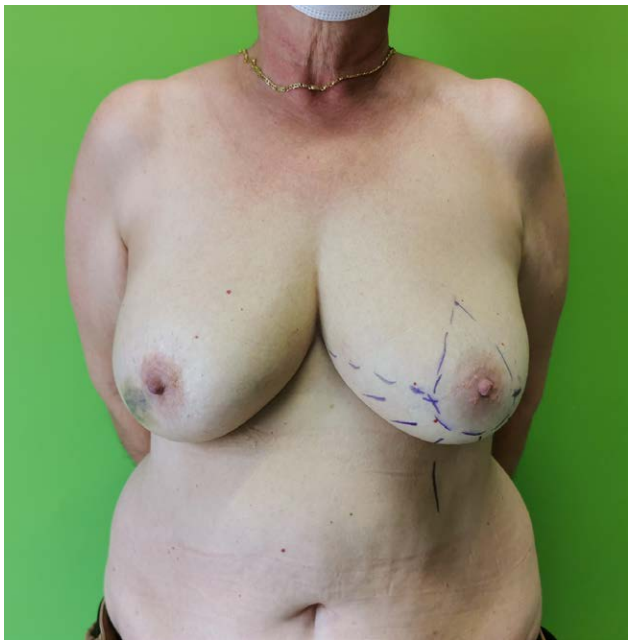

Fig. 1. Preoperative drawings of a patient who was a candidate for nipple-sparing mastectomy but required NAC biopsy due to proximity of tumor.

with breast surgeons. Lower quadrants of the breast are de-epithelialized to obtain the dermal flap. In the case of prophylactic mastectomy, the superomedial pedicle is immediately de-epithelialized.

After subcutaneous infiltration with cold saline solution, we proceed with knife mastectomy, and we try to minimize use of electrocautery and the resulting thermal damage to mastectomy flaps. Any removal of NAC is done at this stage.

In the reconstructive phase, the decision is made to proceed with one-stage or two-stage reconstruction, mainly depending on vascularization status of the mastectomy flaps. Viability of mastectomy flaps and NAC is confirmed by indocyanine green fluoroscopy[6,7] (Fluobeam; Fluoptics Europe) with and without implants (color and fluorescence display with percentage determined on absolute and relative value with adjacent tissues, threshold value 20%). After observation waiting time of 2–5 minutes, we perform any debridement of the mastectomy flaps. We have had no cases in which excessive debridement has prevented the use of this technique. If the area of doubtful vascularization is large enough to not allow reconstruction with prosthesis, we are still able to place an expander. If there are signs of unclear vascularization of NAC, we graft it. When the prosthesis is implanted immediately, symmetry tests are performed using a sizer alongside temporary setup of reconstructed breast. If a breast expander is to be used, it will be implanted immediately. Once type and size of implant has been determined, an 11-cold blade mesh of DS is performed. This allows an increase in size of two to three times the original area (Fig. 2). (**See Video [online]**, which demonstrates the meshing technique in the distal portion of the DS.)

Takeaways

Question: Can the dermal sling also be used in medium-sized breasts to fully cover an implant used for postoncological breast reconstruction?

Findings: We approached patients with medium breast volumes who required reconstruction with an implant and dermal sling by screening the most distal portions of the dermal flap. This allowed complete coverage of the implants.

Meaning: The possibility of offering more patients reconstruction with prepectoral implant and dermal sling without having to resort to acellular dermal matrix with reduced costs and less discomfort for the patient.

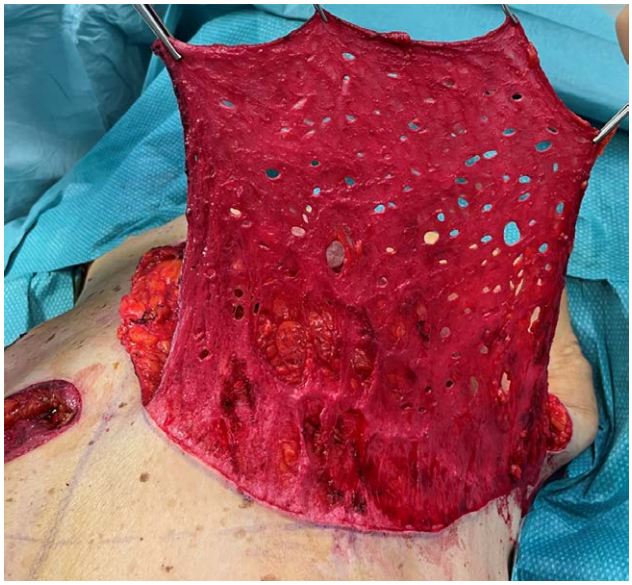

Fig. 2. Meshed DS.

We believe it is of paramount importance in this step to mesh only the distal part, which serves more as graft and not as flap, as discussed earlier. Preserving vascularization of the proximal portion provides additional protection to implant at the T-junction. The distal and thinnest part is treated as a graft and meshed to ensure sufficient dimensional increase. DS thus prepared is then sutured medially and superiorly to the chest wall. The implant is placed from the lateral approach, and the pocket sutured. DS is anchored to pectoral fascia using braided resorbable stitches. If there is any doubt about vascularity of the NAC, it is harvested and grafted.

OUTCOMES

Between December 2020 and January 2023, we have performed 23 breast reconstructions on 19 patients with meshed DS without complications related to implant reconstruction (prothesis contracture or displacement). Sixteen reconstructions took place in two stages, whereas the remaining were one stage direct to implant. Mean

follow-up time was 12 months (6–25). For single-stage reconstructions, average implant volume was 455 cm^3 (350–490); for two-stage reconstructions, average definitive implant volume was 465 cm^3 (395–560). Only minor complications were related to partial suffering of mastectomy flaps (two of 23), where necrosis occurred at the T-junction with subsequent dehiscence of the surgical wound. We have not reported any case of implant malposition that could reflect a failure of the upper portion to fully heal.

DISCUSSION

Protection provided by DS on implants allowed complications to be managed with advanced dressing or performing local resection and suturing. There were no reconstructive failures due to prosthesis exposure or infection. DS, in the case of two-stage reconstruction, appears in all its portions macroscopically integrated between subcutaneous and capsular plane, covering the periprosthetic capsule, thus creating the additional implant coverage that allows prepectoral reconstruction.

DS is therefore a reconstructive method that can be used for breast reconstruction in patients with ptosis and large breasts. However, it does not always allow complete coverage of the prosthesis. With the proposed technique, complete prepectoral reconstruction can be achieved using autologous tissue in both large- and medium-sized breasts (Figs. 3 and 4). As shown earlier, if DS is considered a flap proximally and a graft distally, meshing of the latter would not alter them, and already compromised vascularization and revascularization would come from upper mastectomy flaps. It presents some more advantages. In addition to reducing costs by eliminating need for any type of acellular dermal matrix, DS guarantees the supply of additional vascularized tissue to cover the implant.[3,8,9]

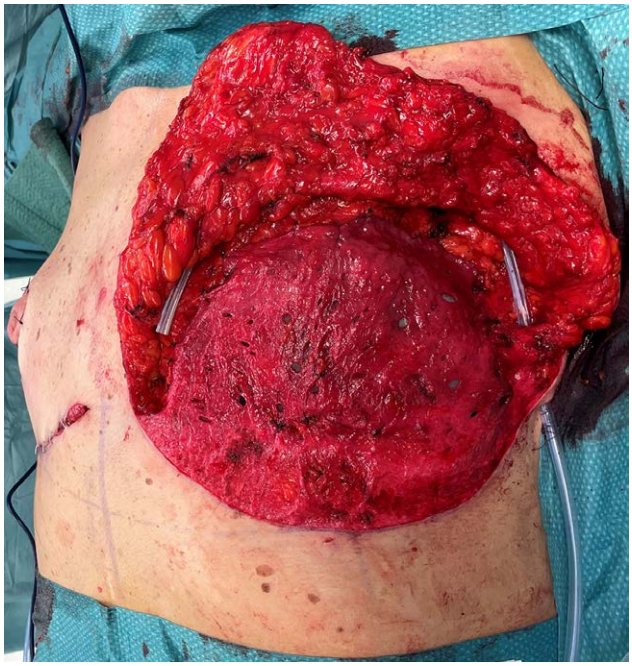

Fig. 3. Complete prepectoral coverage of the definitive implant.

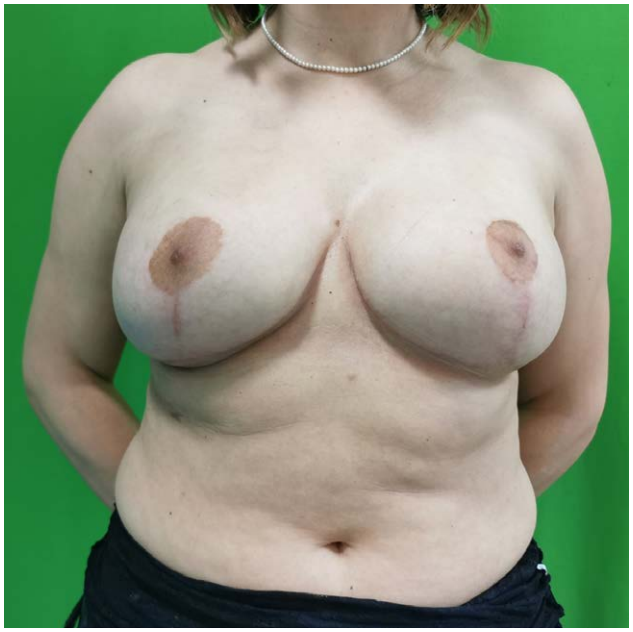

Fig. 4. Postoperative results.

It also expands indications for completely autologous prepectoral reconstruction, offering softer and more natural results to patients with medium-to-large breasts.[10] Finally, as originally described, covering the entire implant allows for greater predictability of implant placement and formation of a more homogeneous capsule with associated additional protection of a layer over the entire implant.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

PATIENT CONSENT

Patients provided written consent for the use of their images.

ETHICAL APPROVAL

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Declaration of Helsinki of 1975. Informed consent was obtained from all patients for being included in the study.

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