An alternative method to create a breast mound after tissue expander insertion: The modified Goldilocks technique

INTRODUCTION

There are many ways to perform breast reconstruction after mastectomy, such as a two-stage operation using a tissue expander, filling the breast volume with autologous tissue, or immediate implant insertion. Tissue expander–based two-stage operations are widely used along with skin-sparing mastectomy or contralateral augmentation [1-3]. However, expansion may fail to occur as desired, or the patient may elect to have the expander removed without replacing it with an implant. Recently, as breast implant-associated anaplastic large cell lymphoma (BIA-ALCL)–related concerns have grown, patients fearing BIA-ALCL have been requesting expander removal without implant insertion [4-6]. In these cases, an area of concern for the surgeon is manipulation of the skin flap that has already been expanded. In particular, the base tissue of the expander often has a depression deformity due to the pressure of the expander. If only expander removal is done, with no implant insertion, the chest wall may look more concave than is the case immediately after mastectomy [7,8]. Here, we present a surgical technique that can be considered for patients who request only expander removal, and do not want the expander to be exchanged for an implant.

CASE REPORT

A 41-year-old woman underwent skin-sparing mastectomy due to breast cancer (stage 3a, T2N1M0). The mastectomy volume was 141 mL and immediate breast reconstruction was performed using a 275 mL tissue expander (Mentor Worldwide LLC, Irvine, CA, USA) and Megaderm (L&C Bio Co., Ltd., Seongnam, Korea). At that time, the patient underwent an expander-based two-stage operation with contralateral breast augmentation. The tissue expander volume was 250 mL at the end of expansion (Fig. 1).

Periodic tissue expansion was performed, but the patient did not want an implant to be inserted after the expander was removed due to concerns regarding BIA-ALCL, which stemmed from the...
first report of a patient with BIA-ALCL in Korea [9]. The expander was removed without implant placement, as requested by the patient, but the depression deformity of the chest wall was prominent, and the expanded skin was used to compensate for the depression.

The expanded skin was maintained at a thickness of 2–3 mm. The remaining skin of the patient was temporarily closed with maximum approximation, and all remaining skin was de-epithelialized and rolled from the outside of the skin into the inside (Figs. 2, 3). This method is similar to the previously reported Goldilocks technique, with a slight modification to the upper pole skin to add volume [10,11]. After skin closure, the patient’s depression was completely corrected and it was possible to create a breast mound, although it was relatively low.

**DISCUSSION**

A small number of patients who have had a tissue expander inserted in the initial stage of two-stage reconstruction may elect to have the tissue expander removed without exchanging it with a permanent implant. Patients may make this decision to avoid the multiple complications that may occur after permanent implant insertion. Recent reports of BIA-ALCL in patients who underwent textured implant insertion have amplified fears regarding implants [4,5]. In this case, we removed the tissue expander after the patient elected not to proceed with a permanent implant, and we addressed the already expanded skin region by using the modified Goldilocks technique.

**Fig. 1.** Clinical photographs. (A) Preoperative clinical photograph. (B) After tissue expansion (250 mL, left breast). (C) Postoperative 2 months.

**Fig. 2.** (A) The expanded skin with the acellular dermal matrix after de-epithelization. (B) Rolling in and approximation of the remaining skin.

**Fig. 3.** Intraoperative photographs. (A) Design of the modified Goldilocks technique. (B) De-epithelization of the remaining skin flap. (C) Postoperative photograph.
If breast reconstruction is not successfully performed with a prosthetic implant, this technique can be used to construct a breast mound and to prepare the tissue for secondary surgery. If a patient with a tissue expander refuses a permanent implant due to implant-related fears, the expanded skin tissue can be used to minimize or prevent chest wall deformation as described. Generally, the depression of the bone during expansion tends to normalize within 2 to 3 months after expander removal [12]. However, because the volume of the breast compared to the contralateral side is insufficient, as much as tissue as possible should be maintained to minimize the imbalance of the chest and to prepare for future reconstruction. In particular, the expanded breast skin may already have been engrafted by application of acellular dermal matrix when the expander was inserted. If used, such tissue may have more sufficient thickness and quality than expected.

However, rolling up the expanded skin for tissue supplementation to create a breast mound may raise concerns about oncologic safety. However, there is no need to worry about cancer recurrence in the skin that remains post-mastectomy, as the oncologic safety of nipple-areolar skin-sparing mastectomy has been proven and widely accepted [13-15]. If a general surgeon performs mastectomy and confirms that the resection margins are free of cancer, this technique may be considered safe on the basis of the evidence to date.

In conclusion, this modified Goldilocks technique is the best way to minimize a chest wall concave deformity and to form a breast mound when a tissue expander is removed without implant insertion. In particular, previously inserted acellular dermal matrix, if present, can be used for tissue supplementation. The safety of this technique has also been proven, and it seems to be a technique with sufficient merits to be worth trying.

NOTES

Conflict of interest
No potential conflict of interest relevant to this article was reported.

Ethical approval
The study was performed in accordance with the principles of the Declaration of Helsinki.

Patient consent
The patient provided written informed consent for the publication and the use of her images.

ORCID
Dong Nyeok Jeon  https://orcid.org/0000-0002-6252-1261
Kyunghyun Min https://orcid.org/0000-0002-7807-0143
Hyun Ho Han https://orcid.org/0000-0001-7072-9882

REFERENCES


