CHAPTER XIV

PRE-PECTOTAL BREAST RECONSTRUCTION WITH ADJUSTABLE IMPLANT/EXPANDER

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Mastectomy has evolved from radical to modified radical, skin sparing, and now nipple sparing mastectomy. With the realization of the safety of less radical procedures, surgeons are leaving thicker skin flaps with improved viability and more focus is being placed on excision with a suitable margin and ease of examinability of residual tissue. These changes have led to modifications in expander/implant reconstruction techniques.

When modified radical mastectomy was introduced, tissue expansion reconstruction became an option. Expanders were initially placed above the muscle for secondary reconstruction [1]. Subsequently, with the advent of immediate reconstruction the expander was placed in a totally sub-muscular pocket, primarily to protect the implant from the overlying extensive incision. Total sub-muscular placement was difficult to perform, particularly when the fascia was removed and muscle inferiorly was deficient. With the introduction of the skin-sparing mastectomy, it was possible to release the muscle inferiorly and fixate it most commonly with sutures, or later, acellular dermal matrix (ADM) grafts. It was preferable to have muscle coverage over the expander therefore horizontal or oblique incisions were preferred [2]. Even though the muscle is released, discomfort and animation remains a problem [3].

Animation deformity is avoided with pre-pectoral breast implant placement. Pre- pectoral reconstruction is facilitated by a vertical mastectomy incision with dermal flap and complete acellular dermal support, together with a smooth flat adjustable implant with remote port [4,5,6,7,8].

Technique

The skin incision is marked out pre-opertatively in conjunction with the surgical oncologist. The incision extends from the areola to the infra-mammary fold. Extension along the areola edge is performed if necessary. At the completion of the mastectomy, the patient is re-draped and hemostasis checked. The lateral skin flap is advanced medially and sutured to the chest wall at the level of the mid axillary line or closer if necessary. A temporary expander is inserted into the pocket and filled to the desired size. The pocket is adjusted further where needed. A sheet of ADM (Flex HD pliable) is sutured to the edges of the pocket with 2/0 Vicryl™ (Ethicon – polyglactin 910 – synthetic absorbable surgical suture composed of a copolymer made from 90% glycolide and 10% L-lactide). This is to simulate the fascial layer (fig 1 and 2).

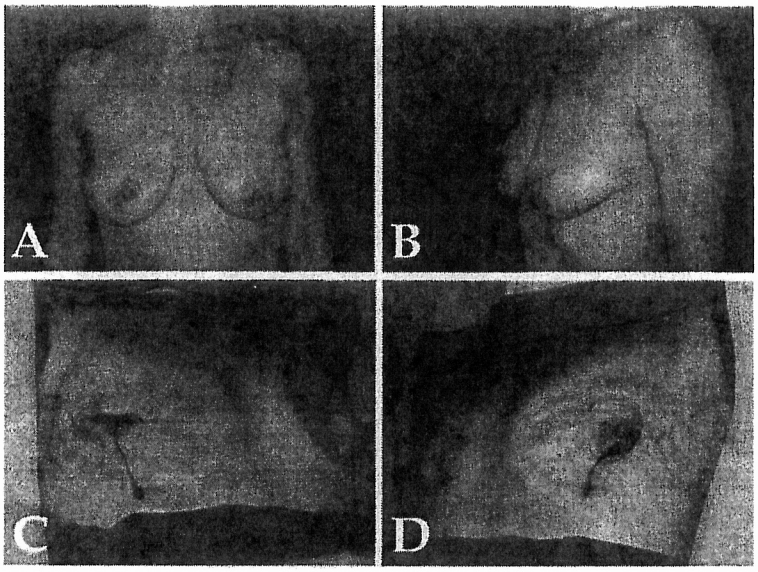

Fig. 1: 43 year old patient with biopsy proven DCIS beneath the right nipple. (A and B) Preoperative appearance. (C and D) Following bilateral mastectomy with a vertical incision. NAC preserved on left.

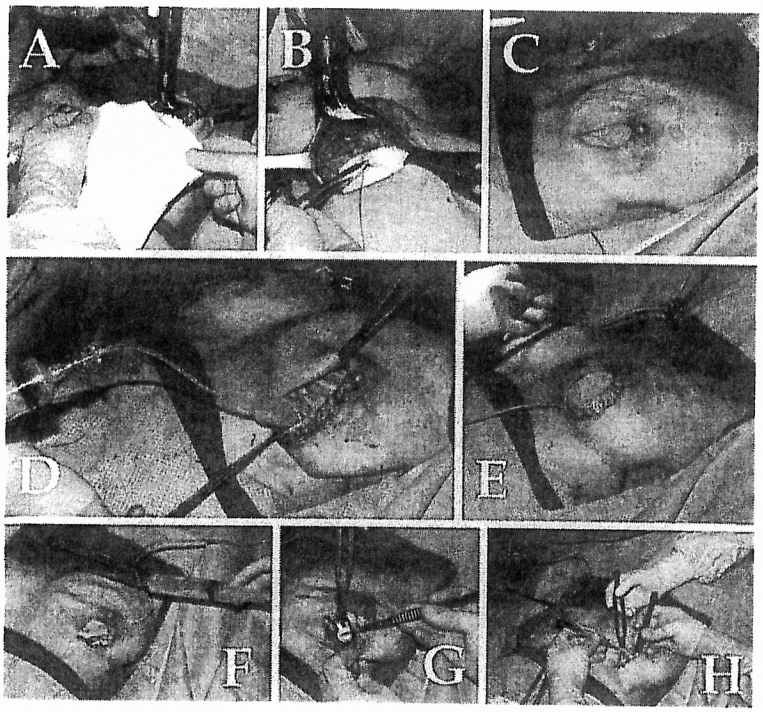

Fig. 2: (A) Acellular dermal matrix – ADM anchored to the upper edge of the pectoralis major muscle. (B) ADM sutured to the medial edge. (C) ADM sutured into position. (D) Temporary intra-operative expander in sub-ADM pocket. (E) Temporary expander filled. Medial edge of lateral mastectomy flap de-epithelialized. (F) Adjustable implant placed in sub-ADM pocket. Partially filled with closed filling system. (G) Injection port placed in sub-cutaneous pocket. (H) Injection port in pocket.

The Mentor® smooth Spectrum™ adjustable implant or the Becker 50/50 is then placed within the pocket. A small amount of saline is added to the implant using a closed filling system. The fill tube is then shortened, attached to the injection port and placed in a subcutaneous pocket lateral to the incision. The pocket is then sutured with 3/0 Vicryl™. Two Jackson-Pratt® silicone drains are placed through long subcutaneous tunnels and sutured to the skin. The medial edge of the lateral flap is then outlined for de-epitheliaziation. The amount de-epithelialized depends on the amount of skin excess. The de-epithelialized flap is tucked under the medial flap and sutured with 3/0 Monocryl™ (Ethicon – poliglecaprone 25 –

monofilament synthetic absorbable surgical suture prepared from a copolymer of glycolide and epsilon-caprolactone). The skin edges are approximated with a running sub-cuticular 4/0 Monocryl™ suture. Bio-patches are placed on each drain, and a 3M™ Tegaderm™ dressing applied (fig. 3 and 4).

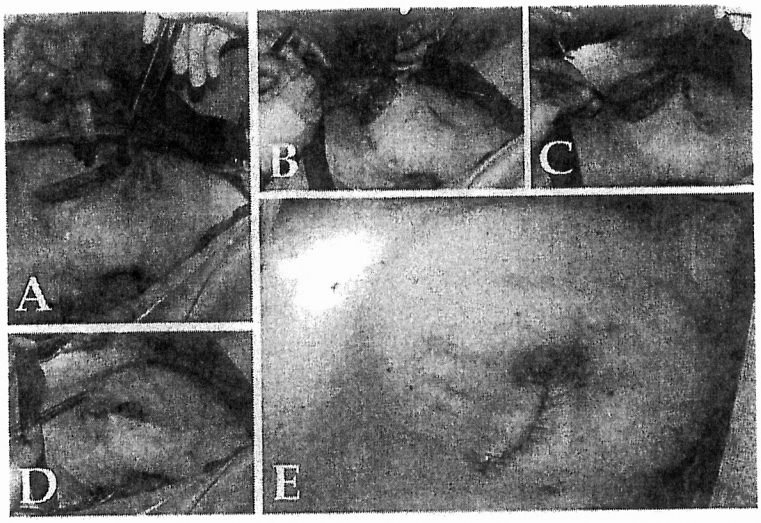

Fig. 3: (A) Platelet rich plasma – PRP applied to ADM. (B) De-epithelialized flap advanced and sutured beneath the medial flap. (C) Medial flap advanced over lateral flap. (D) Dermal closure. (E) Final closure.

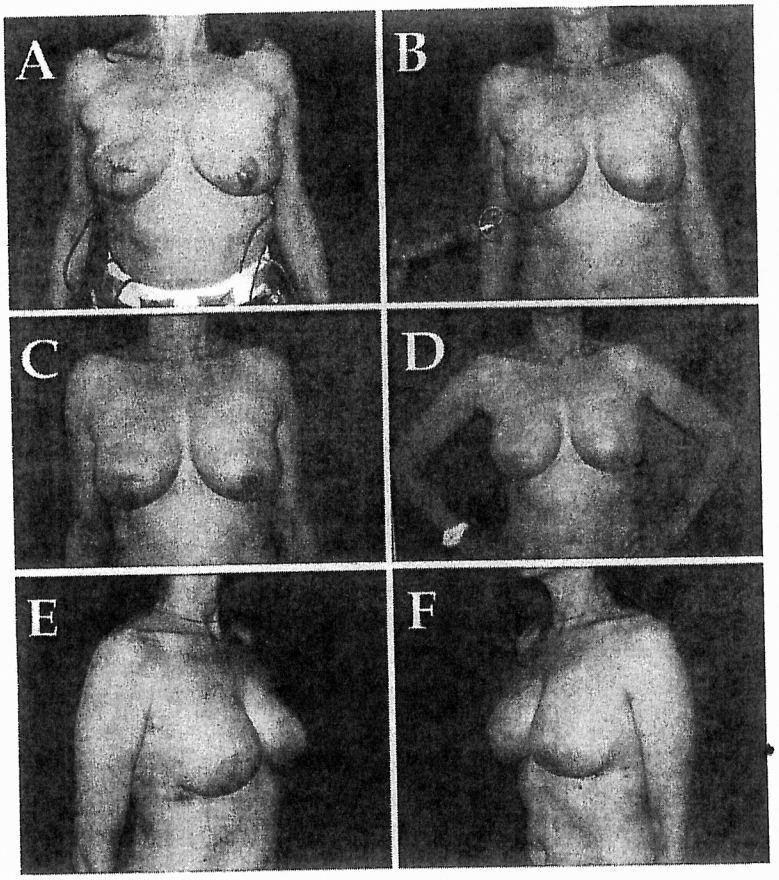

Fig. 4: (A) Early postoperative result. (B) Further saline added to implant via remote injection port. (C) Final result. (D) No animation on muscle contracture. (C) Right side view. (D) Left side view.

Discussion

The results of breast reconstruction are largely related to the residual tissues remaining following the mastectomy. As mastectomy has evolved from radical to modified radical, skin-sparing and now nipple-sparing, reconstructive results have improved [2]. The most common method of breast reconstruction is the placement of a tissue expander beneath the muscle and subsequent replacement with a silicone gel implant. Although excellent results are obtained, scarring, discomfort, and animation deformities are often problematic

complications. Similar animation deformities are seen in sub-muscular augmentation patients [9].

Due to concerns with thin and poorly vascularized skin flaps, expanders are traditionally placed in a sub muscular pocket. As the muscle inferiorly is thinner and unpredictable, it is preferable to have a horizontal incision so that the thicker upper muscle protects the expander. With the evolution of less radical mastectomies, the quality of the remaining skin flaps has improved. With less concern about compromised vascularity it is now possible to place an expander above the muscle. In 2007 Eskenazi [10] described pre-pectoral breast reconstruction using an adjustable implant [4]. Pre-pectoral placement of an under-filled adjustable implant with total implant ADM coverage enables total freedom of incision placement. This has led to more frequent use of the vertical incision.

There are numerous advantages to pre-pectoral implant placement:

1- From an oncologic perspective, the supra-muscular technique is advantageous because no additional tissue planes are opened, decreasing the area of potential surgical seeding of cancerous cells.
2- A more natural feel: pre-pectoral placement approximates the natural position of the removed breast tissue.
3- Less muscular trauma: resulting in less pain and more rapid recovery.
4- Less pressure on flaps: the use of an adjustable flat expander with a remote port, placed under-filled, causes no increased pressure to the flaps during the immediate recovery phase. The expander can later be adjusted to the patient's preference.

A vertical incision offers numerous advantages:

1- Adequate or improved access for the mastectomy, with comparable visualization.
2- Improved cosmetic result: the scar resembles that of a breast lift.
3- Less interference with blood supply to flaps: the incision runs parallel to the direction of blood flow running in the watershed

of the lateral and medial blood supply to the breast resulting in less vascular compromise of the skin flaps.

4- Improved initial shape: revision of the scar does not cause distortion of breast shape.
5- Improved nipple position: the nipple does not tend to drift laterally or superiorly.
6- Applicability to a variety of breasts: the technique is applicable to small breasts and to large ptotic breasts (particularly where reduction and/or elevation is necessary).
7- A thicker natural flap: the vertical incision allows for de-epithelialization of a portion of the lateral flap, which can be tucked beneath the medial flap to offer added protection and support to the implant. Similarly further revisional surgery, tightening and elevation can be performed postoperatively without additional scarring [11,12].

Postoperative enhancements of thin skin flaps or depressed areas can be further enhanced, by the addition of acellular dermis or by means of fat injections

REFERENCES:

1. Radovan C. Breast reconstruction after mastectomy using a temporary expander. Plast Reconstr Surg. 1982; 69:195-208.
2. Maxwell GP, Storm-Dickerson T, Whitworth P, Rubano C, Gabriel A. Advances in nipple-sparing mastectomy: Oncological safety and incision selection. Aesthetic Plast Surg. 2011; 31:310–319.
3. Spear SL, Schwartz J, Dayan JH, Clemens MW: Outcome assessment of breast distortion following sub-muscular breast augmentation. Aesthetic Plast Surg. 2009; 33:44-48.
4. Becker H. Breast reconstruction following subcutaneous mastectomy using a delayed filling volume adjustable breast implant. Transaction VIII International Congress of Plastic Surgery, Montreal, Canada, 1983.
5. Becker H. Basic technique and indications for the use of the adjustable implant. Innovations in Plastic Surgery. 2005; 1:10-44.
6. Persoff MM. Use of the adjustable spectrum implant in aesthetic breast surgery. Innovations in Plastic Surgery. 2005; 1:64-81.
7. Becker H. *One-stage immediate breast reconstruction with adjustable implants. In:* Surgery of the Breast, 3rd edition. Scott L. Spear editor, Wolters Kluwer – Lippincott Williams and Wilkins. Chapter 30:357-375.

8. Becker H. Adjustable breast implants provide postoperative versatility. Aesthet Surg J. 2000; 20: 332-334.
9. Goes JC, Landecker A: Optimizing outcomes in breast augmentation: seven years of experience with the subfacial plane. Aesthet Plast Surg. 2003; 27:179-184.
10. Eskenazi LB. New options for immediate reconstruction: achieving optimal results with adjustable implants in a single stage. Plast Reconstr Surg. 2007; 119:28-37.
11. Atiyeh B, Becker H, Ibrahim A, Papazian N, Dibo S. Simplified skin excision pattern for skin sparing/reducing mastectomy and direct-to-implant single-stage immediate (DISSI) breast reconstruction. Eur J Plast Surg. 2015; 38:299-300.
12. Atiyeh B, Abbas J, Costagliola M. Dermal barrier for immediate prosthetic breast reconstruction. Rev Bras Cir Plást. 2012; 27:630-635.