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Trans-axillary approach for breast implant exchange in high risk cases of irradiated or attenuated skin☆

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Summary *Background:* Breast reconstruction with implants after tissue expansion is one of the most common methods of reconstruction. Although this approach is generally reliable, exchange of breast tissue expander for implant through the standard anterior incision presents a challenge in cases with attenuated soft tissue envelope due to radiation, thin anatomy, prior surgery, or combination of the above. We propose that a trans-axillary approach is a safe and alternate approach for implant exchange in the high-risk patients.
Technique and case examples: A case series of 16 patients with multiple risk factors for compromised soft tissue that underwent a trans-axillary approach for implant exchange is reported. The trans-axillary implant exchange technique involves use of a standard 4 cm axillary incision, removal of the expander, judicious capsulotomy, placement of permanent implant, and closure in three separate tissue layers.
Results: All trans-axillary cases were successful and all incisions were well healed without dehiscence, infection, or seroma. The average patient age was 49.4 years, and 50% of patients had received or were scheduled to receive radiation therapy. Nine patients underwent unilateral trans-axillary expander exchange while 7 patients were bilateral. Median implant size was 360 cc (mean 369 cc, range 150—600 cc), and mean follow-up for all patients was over 24 months. There were no cases of implant extrusion, capsular contracture requiring reoperation, or lymphedema. Six patients underwent concurrent or subsequent nipple reconstruction.

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Conclusions: This approach illustrates application of a technique commonly used in breast aesthetic augmentation to address a common reconstructive dilemma, which we believe to be a useful tool in prosthesis-based breast reconstruction, especially in patients with compromised soft tissue envelopes.

Background

Breast cancer is a common problem with a lifetime prevalence of approximately 12% in the United States.[1,2] Although there are multiple options for reconstruction following mastectomy, most women (approximately 70%) undergo prosthetic-based breast reconstruction in one or two stages.[3] With an increase in the prevalence of prophylactic mastectomy over the last decade, there has been a shift from autologous to implant-based reconstruction.[4–6] Although highly successful in general, implant-based reconstruction presents a challenge in the setting of pre- or post-operative radiation, where complication rates are high and range between 40 and 70%.[7–12] The types of complications include infection, implant extrusion, capsular contracture, and persistent pain.[13–15] For this reason, radiation therapy has historically been considered a major risk factor for implant-based breast reconstruction. Although recent case series have described successful application of prosthetic breast reconstruction in the setting of peri-operative radiation, the complication rate remains significant.[16–18] Some of the current work aims to determine whether it is more advantageous to perform tissue expander exchange before or after post-mastectomy radiation therapy (PMRT), where most studies suggest it is more advantageous for the exchange to occur before PMRT.[17]

In addition to radiation, patients can develop attenuated breast skin for various reasons. Skin attenuation can result from loss of skin due to mastectomy flap necrosis, thinning with long dwelling expanders or implants, or from the process of tissue expansion itself, especially in thin patients with small breasts. These factors individually or in combination can place patients at risk for poor soft tissue healing during future procedures, and can lead to acute wound complications and implant exposure.

In fact, breast reconstruction violates many principles we observe when placing implants in other sites of the body. For example, when craniofacial implants or scalp tissue expanders are placed, these devices are often placed remote form the access incision, to avoid the problem of device exposure should dehiscence occur. However, in breast reconstruction, the incision for mastectomy is often made at the level of the nipple anteriorly, and the tissue expander by necessity is then placed directly beneath the incision. This violation of the principle of technical surgery and the associated tissue ischemia are the genesis for much of the complications observed with prosthesis based breast reconstruction.

To mitigate the risk of wound complications from implant exchange, we describe application of the well known trans-axillary approach, generally used in cosmetic breast augmentation, for exchange of tissue expander for implant in cases of staged breast reconstruction in high-risk patients. We describe our experience in 16 cases that were performed over a 12-month period, with greater than 24-month follow-up. As with any procedure, this technique is intended for the properly selected patients with aforementioned risk factors to reduce the risk of incision-related complications. This technique observes the principal of placing the incision apart from the prosthesis, outside the zone of injury; considering options and placing the incision "outside the box."

Technique and case examples

A retrospective review was performed of 16 patients who underwent trans-axillary tissue expander exchange to permanent implant over a 12-month period from March 2011 to March 2012. All procedures were performed by the senior author. During this time period, the senior surgeon performed 136 immediate breast reconstruction procedures, 56 (41%) were flap based and 80 (59%) were prosthesis based. Of the 80 prosthesis-based cases, 28 (35%) were single stage immediate to implant and 52 (65%) were staged tissue expander placement followed by exchange. Of the staged breast reconstruction patients, 16 (31%) were considered to be high-risk, for exhibiting the risk factors of having peri-operative radiation, thin patients, with thin breast flap. These patients were also either too thin for total autologous reconstruction to be worthwhile, declined autologous options, or declined morbidity of a latissimus flap. This explains why there were only 16 patients. Patients were selected for this technique if they had or would undergo radiation treatment, or if their skin demonstrated significant attenuation. Patient characteristics reviewed included age, laterality of reconstruction, presence or absence of radiation, timing of radiation (if present), permanent implant size, duration of follow-up, and complications.

Surgical technique

Breast landmarks are drawn with the patient standing, noting the infra-mammary fold, superior pole, and axillary line extending to the pectoral groove. The patient is then positioned supine on the operating room table with arms extended at 90°. A 4 cm transverse incision is made in the axilla, staying posterior to the reflection of the pectoralis muscle insertion. Subcutaneous dissection is directed toward the implant capsule under the pectoralis major muscle. A lighted retractor was used to aid in capsule dissection