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Successful Mastectomy Reconstruction after Successful Oncoplastic Breast Reconstruction: Maximizing Aesthetic and Oncologic Outcome

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Abstract

Background: Breast reconstruction serves as a critical and technically demanding element of comprehensive oncologic care. Oncoplastic reconstruction following breast conserving surgery yields excellent aesthetic results and maintains oncologic safety with survival rates equivalent to mastectomy. Management of recurrent breast cancer in the previously radiated breast can be challenging as oncologic and aesthetic goals must be balanced in the setting of previous surgical scars, radiation, chemotherapy, and patient comorbidities. The reconstructive plastic surgeon should have all tools available to manage and treat the breast cancer patient along their entire journey including recurrences and anticipated complications. **Purpose:** To educate the early career Plastic & Reconstructive surgeon how to manage a common and challenging clinical scenario of a breast cancer recurrence after prior oncoplastic reconstruction. **Methods:** A case report is presented on one patient who underwent successful oncoplastic reconstruction following breast conserving surgery and later developed a recurrent breast cancer. **Results:** Initial oncoplastic reconstruction of the lumpectomy defect yielded excellent aesthetic results. Management of recurrent breast cancer required thoughtful consideration to ensure oncologic safety while adapting the reconstructive strategy in the setting of prior radiation. The definitive aesthetic component was intentionally delayed until completion of oncologic therapy and stabilization of medial and patient factors. **Conclusions:** Successful oncoplastic reconstruction and successful mastectomy reconstruction are often employed in the same patient throughout different stages of their breast cancer journey. Plastic & Reconstructive breast cancer surgeons need to be knowledgeable of all techniques of breast cancer reconstruction and need to pre-emptively address complications or possible

recurrences from the initial consultation to the final aesthetic procedure.

Keywords

Breast, Cancer, Autologous, Reconstruction, Mastectomy, Oncoplastic Breast Surgery

1. Introduction

Breast cancer reconstruction is a challenging aspect of Plastic & Reconstructive surgery and has evolved significantly over the past decade. Techniques used to maximize outcome in aesthetic breast surgery are employed in breast cancer surgery to prevent deformity post lumpectomy and improve aesthetics of the reconstructed breast [1]-[3]. Oncoplastic reconstruction after breast conserving surgery delivers excellent treatment and improves aesthetics with equal survival to mastectomy. In our practice, we offer both oncoplastic reconstruction techniques for patients who choose lumpectomy as well as all aspects of mastectomy reconstruction including implant and autologous reconstruction with DIEP flaps and latissimus flaps [4]-[7].

As our practice has matured, we have increasingly encountered patients, both through internal follow-ups and external referrals, who develop cancer recurrences following successful oncoplastic reconstructions. In these cases, the primary challenge for the surgical team is to preserve the high-quality aesthetic results previously achieved while ensuring that the necessary oncologic treatments, such as chemotherapy or radiation, are not compromised. Balancing the reconstructive goals with the urgency of secondary cancer treatment is a critical priority.

Factors such as previous radiation, multiple incisions, need for additional chemotherapy, in combination with an inherent "devascularizing" operation, impair mastectomy healing make this process extremely challenging for the breast oncologic surgeon as well as the Plastic & Reconstructive surgeon. Finally, patients may be frustrated at having multiple previous surgeries and now an excellent aesthetic result that may be less than optimal in the future. Managing that frustration in the face of a patient who is scared about breast cancer recurrence requires patience and insight among all members of the breast cancer team. We present here a case report that explains a framework to best manage expectations as well as treating the problem at hand in the breast cancer patient with recurrent cancer following oncoplastic reconstruction after breast conserving surgery.

2. Material & Methods

A case-report of one patient who underwent oncoplastic reconstruction of a lumpectomy defect by the senior author (B.D.) who then required mastectomy and then delayed implant breast reconstruction. The case report is a representative

example of the most common clinical scenarios encountered in the post oncoplastic reconstruction patient with a recurrence that requires mastectomy.

3. Results

A 59-year-old postmenopausal female underwent left breast lumpectomy with intraoperative radiation therapy (IORT) for a 3 cm, grade 2 invasive ductal carcinoma (IDC), estrogen receptor positive (ER+), progesterone receptor positive (PR+), and Ki-67 15% herceptin receptor (Her2−). Sentinel lymph node biopsy was negative, and final surgical margins were greater than 1cm. IORT was given with 20 Gy (50 kV) x-ray using the Xoft Axxent Electronic Brachytherapy System (Xoft, San Jose, CA, USA, a subsidiary of iCAD, Inc.). The Oncotype DX recurrence score was 23, and adjuvant chemotherapy was not recommended. The patient was started on adjuvant endocrine therapy with anastrozole.

At 61 years of age the patient developed a contralateral right breast cancer and underwent right breast lumpectomy with oncoplastic reconstruction using an oncoplastic split at the 1 o'clock position (Figure 1). Pathology demonstrated a 1.5 cm IDC, grade 2, ER+/PR+/Her2−, and Ki-67 10%. Sentinel lymph nodes were negative. Surgical margins were greater than 1 cm with the exception of the superficial margin which measured 0.25 cm and included skin. The Oncotype DX recurrence score was 31. The patient received adjuvant chemotherapy with docetaxel and cyclophosphamide followed by ultra-hypofractionated whole breast radiation therapy (5 fractions), and continued oral anastrozole.

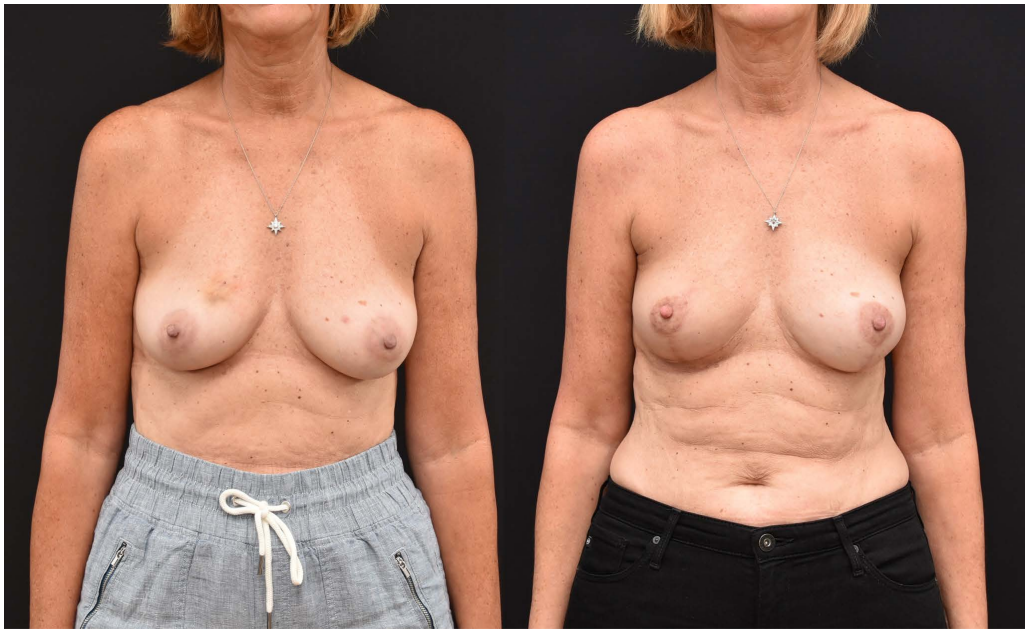

Figure 1. 62-year-old female who underwent previous left breast lumpectomy and IORT. She then developed a right breast cancer for which she underwent right breast lumpectomy with oncoplastic split at the 1 o'clock position followed by right whole breast radiation and left breast mastopexy for symmetry. She presented to us with a left breast cancer recurrence and the excellent aesthetic result below from her previous oncoplastic reconstruction.

At 63 years of age, surveillance breast imaging identified a left breast cancer recurrence. Pathology demonstrated recurrent grade 2 IDC, ER+/PR+/Her-2−, Ki-67 10%. The patient had an excellent result from her previous oncoplastic reconstruction of the right breast and whole breast radiation therapy as well as her previous left breast lumpectomy/IORT followed by mastopexy (**Figure 1**). As this was the patient's 3rd episode of breast cancer in a previously irradiated breast, bilateral nipple removing mastectomy was selected as the most definitive oncologic treatment and for the patient's peace of mind. Given the high likelihood of needing chemotherapy post-operatively as well as the previously irradiated breast we chose bilateral mastectomy and closure without the excess burden of tissue expander or implant placement to allow the patient to complete the oncologic component of her therapy before deciding on a reconstructive option or method (**Figure 2**). The patient healed her bilateral mastectomies and subsequently completed adjuvant chemotherapy with cyclophosphamide, methotrexate, and 5-fluorouracil.

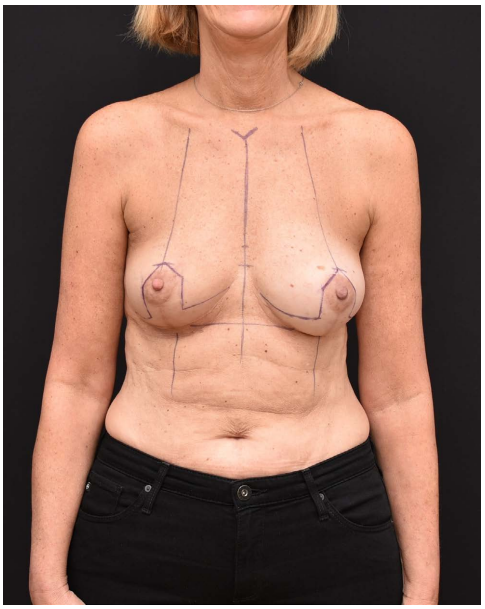

Figure 2. Given the history of multiple previous cancers we planned for bilateral nipple removal mastectomy using inverted-T incisions. The inverted T pattern removed the previous NAC as well as provided a clear anterior margin by removing the skin above the left breast recurrent cancer. The right side had previous whole breast radiation therapy and the left breast previous IORT.

The patient presented again to us one year after her mastectomies and desired breast reconstruction (**Figure 3**). The skin was well healed and adherent to the underlying pectoralis major muscle. There was some mild skin redundancy at the apex of the inverted-T incision as well as lateral at the level of the anterior axillary line. The skin was soft with mild radiation changes on the right and minimal to no observable radiation changes on the left. The surgical plan was for direct placement of mammary prosthesis without tissue expanders as the patient was fine with

a reconstruction size of similar size or smaller to her pre-mastectomy size. Bilateral mammary prostheses were placed in the submuscular position. At one year post-operatively, the patient had an excellent result. The right side had a Baker II capsular contracture with no pain and the patient liked the position of the right implant reconstruction preferably over the left (Figure 4).

Given the patient's preference for the position of the right previously radiated appearance we brought the patient to the operating room and performed a revision breast reconstruction with placement of Strattice acellular dermal matrix to support and hold the left breast mammary prosthesis in a more elevated position (Figure 5). At 6 months post-operatively the patient remains happy with her overall aesthetic appearance and remains cancer free.

Figure 3. Bilateral mastectomy and DIEP flaps for left breast cancer/TP53 genetic mutation. The NAC will not remain viable in the ptotic breast.

Figure 4. Bilateral breast reconstruction with implants were placed in the submuscular position without interval placement of tissue expanders. At one year post-operatively, the patient had an excellent result. The right previously whole-breast irradiated side had a mild capsular contracture and the left side that received IORT was lower in position.

Figure 5. Before and after bilateral implant based reconstruction for mastectomy. The patient underwent reinforcement and support of the left inframammary fold with Strattice acellular dermal matrix for support of the implant to match the right radiated side.

4. Discussion

It is important for the Plastic & Reconstructive breast surgeon to be knowledgeable of the different treatment modalities for breast cancer as well as the myriad methods of reconstruction. It is important for the reconstructive surgeon to not "restrict" themselves as just oncoplastic surgeons, implant surgeons, or flap surgeons only. All the different modalities are essential for breast reconstruction and not one method is superior to another. One patient may choose to undergo mastectomy treatment from the "get-go" while other patients may opt for lumpectomy initially and then achieve cure without progressing to mastectomy. An alternative pathway may be lumpectomy and radiation initially and then may need a more complex reconstruction. This can be done with either implants or autologous tissue, and in some cases a combination of both. When treating these patients, we use these common principles to optimize oncologic and aesthetic outcomes.

1) Be mindful of the cancer. The plastic surgeon needs to be an oncologic surgeon first.

Our patient underwent successful oncologic treatment of both the left sided cancer and the right sided cancer with good margins. The aesthetic result of the lumpectomy procedures yielded an excellent result despite different radiation modalities. The reconstruction was soft, sensate, and with the presence of bilateral nipple areola complexes. When faced with the left breast recurrence, preserving the aesthetic result becomes secondary. While it is becoming more acceptable to proceed with additional breast conservation therapy after breast conserving recurrence, the needs and desires of the patient and standard of care in the community needs to be considered [8]-[10]. In this patient chemotherapy was highly likely after mastectomy as the patient could no longer receive radiation. In patients

where a certain modality becomes important and/or the sole modality, it is important that this does not get disrupted. Even if this means not placing a tissue expander or implant at the time of the mastectomy. Additional foreign body burden post mastectomy can lead to infection and interruption of chemotherapy. It's ok to proceed with delayed reconstruction. It's not a failure.

2) Be mindful of the patient's psyche. Patients get beat-up from multiple surgeries and bouts with cancer.

It is important to know when the patient has had enough. Having to deal with a cancer diagnosis is challenging. It is even more challenging to deal with the recurrence of a cancer or the development of a new cancer in the same or different breast. This becomes even more challenging for the patient who has to undergo chemotherapy more than once in their lifetime. The addition of more surgical procedures can be even more daunting for some patients. It is sometimes easier and faster for patients to put their cancer in the "rear view mirror" without additional surgery such as exchanging expanders for implants or dealing with sequelae of breast implants. It's perfectly fine to not proceed with implant reconstruction or autologous reconstruction at the time of mastectomy in the recurrent breast cancer patient.

3) Time can be on your side. Use it to your advantage.

Time can be an invaluable tool for the plastic and reconstructive surgeon. Delayed mastectomy reconstruction is a viable option [11]-[13]. Allowing the mastectomy skin flaps to adhere to the pectoralis and serratus muscle can lead to revascularization, improved venous return, establishment of skin immunity, and a possible reduction in future seroma formation. This revascularization can lead to more healthy appearing skin as well as functioning skin. Placing a pre-pectoral expander in this population can lead to skin atrophy, seroma formation, and implant malposition. The atrophy of the skin in this subset is often what leads to long term implant complications such as infection, extrusion, or malposition. Allowing the skin to recover also allows the patient to recover from chemotherapy, recover nutritionally, as well as mentally. The most important part is that the patients are comfortable that the cancer is behind them so they have the right mindset to proceed with more reconstructive surgeries. Trying to salvage an implant in these patients is just one more hit to the psyche. Come back another day for the reconstruction when everyone is in a better mindset and in a more healthful position.

When the patient is without the reconstruction, the patient often grows accustomed to a smaller breast size. This can often decrease the perceived volume the patient wants. The smaller the implant placed in the reconstruction, but one that can still allow the patient to feel comfortable is super helpful in reducing future complications. Larger implants are more prone to bottoming out based on weight, and larger implants in the smaller soft tissue envelope lead to misshapen and capsular contracture prone reconstructions. The smallest implant that can do the job and make the patient happy is the right way to go.

4) Be prepared for revisional surgery. It's often not a failure. It is often a sign

that the patient is happy and just wants to improve on the outcome if possible.

Radiation is challenging. Capsular contracture of radiated tissue in mastectomy reconstruction is real. However, the breast that is radiated post lumpectomy is much more mild and tolerating of an implant than mastectomy and radiation. While capsular contracture is still common, often patients will like the appearance and position of the radiated breast which is now "perky" and in a more aesthetic position. More often than not, the plastic & reconstructive surgeon will find themselves working to elevate the non-radiated side or side that received IORT as we observed in this case. In these patients, permanent sutures for capsular surgery as well as the more substantial Strattice acellular dermal matrix helps hold the repair. Delayed implant reconstruction in the previously radiated patient is a viable option for many patients (**Figure 6**).

Figure 6. Final before and after bilateral mastectomy and implant reconstruction in the previously right whole radiated breast and left breast IORT. The patient is happy with her final aesthetic result and remains cancer free.

Stick in it with the patients. Plastic surgeons can often perceive the patient's complaints as dissatisfaction with the reconstruction. This is not often the case. This can often stem from a patient who is now comfortable again wearing a strapless dress, bikini, or athletic gear that is now starting to reveal dog ears or bra fat. It's ok to go back to the operating room to repair or improve on these things. The patients will appreciate it and their body image will continue to improve.

Breast reconstruction is challenging for surgeons early in practice, and for patients. While the recommendations/explanations above are case based, it demonstrates many of the scenarios the early Plastic & Reconstructive surgeon in practice will encounter in a single patient. It can initially be difficult for breast surgery teams to determine the best method of oncologic treatment and reconstruction that will yield the optimal cosmetic and oncologic outcome with an expeditious return to normal life. The more knowledgeable the members of the treating team are of each other's roles and how treatment decisions impact both oncologic and

aesthetic results, the more favorable outcome will result.

5. Conclusion

The plastic surgeon authors of this paper have learned a great deal from the oncologic surgeons on this publication and we try to be cognizant of the oncologic principles, results, outcome, and quality of life of the cancer patient. It has been our goal to optimize the oncologic and aesthetic outcome of mastectomy cases to meet or exceed the results of lumpectomy with oncoplastic reconstruction. Results are variable. Appropriate multidisciplinary planning and experience can yield consistent satisfying results.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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