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Breast

Outcomes of Nipple-sparing Mastectomy with Reconstruction after Recent Oncoplastic Wise-pattern Reduction

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Background: For patients with large and/or ptotic breasts, a planned staged approach to nipple-sparing mastectomy (NSM) has been described. Less is known about surgical outcomes of unplanned staged NSM for management of positive margins after partial mastectomy with oncoplastic reduction. It is not clear from earlier studies whether an interval of less than 10 weeks between oncoplastic reduction and NSM is feasible, when a shorter interval is important for oncologic reasons.
Methods: This is a single institution analysis of patients from 2018 to 2021 with a diagnosis of invasive cancer or ductal carcinoma in situ who underwent NSM after oncoplastic breast reduction for positive margins or nodes. The primary endpoint measured was nipple loss. Secondary outcomes were need for operative re-intervention and wound complications.
Results: Nine patients (14 breasts) underwent partial mastectomy with oncoplastic Wise-pattern breast reduction, followed by NSM. Three patients underwent intersurgery chemotherapy. The average interval between oncoplastic reduction and NSM was 11.3 weeks when excluding patients undergoing chemotherapy (range 8–13 weeks). Thirteen breasts (93%) underwent pre-pectoral direct-to-implant reconstruction. One breast (7%) received autologous reconstruction. One breast required reoperation for seroma. The rate of partial or total nipple loss was 0%, with an average follow-up of 1.6 years.
Conclusions: Our experience demonstrates excellent outcomes from NSM after oncoplastic breast reduction, with the majority of patients undergoing single-stage pectoral direct-to-implant breast reconstruction. Overall, patients had a shorter intersurgery interval, compared with prior studies, with no cases of nipple loss. An intersurgery interval of 8 weeks may be feasible when avoiding delays is important for oncologic reasons.
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INTRODUCTION

In select patients, nipple-sparing mastectomy (NSM) can achieve similar oncologic outcomes as skin-sparing mastectomy or total mastectomy.[1] Additionally, NSM often confers improved body image, sexual well-being, and psychosocial well-being compared with skin-sparing mastectomy, making NSM a valuable option for women who require mastectomy.[2]

NSM has traditionally been offered to women with small nonptotic breasts and small tumors remote from the nipple–areola complex (NAC).[1] For patients undergoing NSM, it is essential to ensure appropriate nipple position while preserving blood supply to the nipple, which may be more challenging in women with large and/or ptotic breasts. Furthermore, the remaining skin envelope is often too large for successful implant or autologous breast reconstruction. Thus, to both reduce the breast skin envelope and reposition the NAC to a more cosmetically appropriate position, a staged approach of Wise-pattern reduction mastopexy followed by NSM has been described.[3]

Staged NSM can be categorized as planned or unplanned. For women with large and/or ptotic breasts

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wishing to pursue NSM, planned staged NSM starts with either a mastopexy or oncoplastic reduction. This allows for resection of breast tissue, with or without lymph nodes, and tailoring of the NAC position and breast envelope in preparation for subsequent NSM. However, NSM is considered unplanned when a patient undergoes lumpectomy with breast reduction with the intent of breast conservation but has an unanticipated positive margin, followed by completion NSM. In either planned or unplanned NSM, the optimal interval between breast reduction and subsequent NSM is ill-defined.[3,4] For those women undergoing a staged approach for cancer risk reduction, there can be a longer interval between operations since there is presumably no underlying malignancy. However, for women with an unanticipated positive margin in the setting of a cancer diagnosis, NSM is ideally performed sooner to avoid treatment delays, which are associated with increased risk of cancer recurrence.[5] This study focuses on outcomes in patients who underwent staged NSM after oncoplastic breast reduction to determine if NSM can be done safely with a shorter inter-surgery interval than previously reported and whether pre-pectoral direct-to-implant (pDTI) reconstruction can be performed successfully with minimal complications in this setting.

Takeaways

Question: To study outcomes on unplanned staged nipple sparing mastectomy (NSM) after oncoplastic wise pattern breast reduction for the management of positive margins or nodes.

Findings: Nine patients (14 breasts) underwent oncoplastic Wise-pattern breast reduction, followed by NSM. Average interval between oncoplastic reduction and NSM was 11.3 weeks when excluding patients undergoing chemotherapy. Thirteen breasts (93%) underwent direct-to-implant reconstruction (pDTI). Rate of partial or total nipple loss was 0%, with follow-up of 1.3 years.

Meaning: NSM after oncoplastic breast reduction can be performed safely, with a majority of patients undergoing pDTI breast reconstruction.

METHODS

This was an institutional review board approved, retrospective study performed at Luminis Health Anne Arundel Medical Center (Annapolis, Md.) from 2018 to 2021 of consecutive patients with a diagnosis of invasive breast cancer or ductal carcinoma in situ who underwent NSM via inframammary incision, after partial mastectomy with oncoplastic Wise-pattern breast reduction. The primary outcome measured was nipple loss. The secondary outcomes measures included rates of reoperation, infection, hematoma, seroma, and nipple epidermolysis. Patients who underwent NSM via dismantling the vertical limb of the Wise pattern were excluded because this approach is not the institutional standard.

All partial mastectomies and NSM were performed by board-certified, fellowship-trained breast surgical oncologists. Oncoplastic breast reductions and subsequent reconstruction after NSM were performed by one of three board-certified plastic surgeons. All patients underwent standard Wise-pattern reduction with an inferiorly-based pedicle. During NSM, perfusion assessment was done using indocyanine green angiography to ascertain tissue perfusion in eight of nine patients. Breast implants were wrapped in human acellular dermal matrix in seven of eight patients who underwent implant-based reconstruction. All implants were placed in the pre-pectoral plane. In eight patients, incisions were managed using the Prevena or Prevena Restor Bella Form (3M/KCI) negative pressure incision management systems. Patient data was retrospectively collected and stored using the REDCap platform and subsequently analyzed.

RESULTS

From 2018 to 2021, 649 patients underwent partial mastectomy with oncoplastic breast reduction; eight of these went on to unplanned NSM due to unanticipated positive margins at the time of oncoplastic breast reduction. An additional patient had a partial mastectomy with oncoplastic breast reduction, followed by planned NSM. This patient with planned staged NSM had a strong desire for preservation of the NAC, and because of large breast size and ptosis, underwent a planned staged approach with chemotherapy administered between lumpectomy/oncoplastic breast reduction and NSM.

Table 1 summarizes preoperative characteristics and demographics. The mean patient age was 49 years (range 36–58 years), and the mean body mass index was

Table 1. Patient Characteristics and Tumor Type

Patient	Age at Diagnosis	BMI	Average SNTND (cm)	Breast Cup Size	Breast Involved	Quadrant	Tumor Type by Excision	Smoking Status	Free Nipple Graft	Follow-Up (mo)
1	44	31	29	38D	Right	UO	DCIS, IDC	Never	No	27.5
2	57	40	41	42DDD	Right	LO	DCIS, IDC	Never	Yes (U)	25.4
3	38	49	42	44F	Right	UI	DCIS, IDC	Former	Yes (B/L)	23.7
4	43	30	NA	34DDD	Right	UO	DCIS, IDC	Never	No	24.3
5	46	22	24	n/a	Left	LI	DCIS, IDC	Never	No	2.0
6	58	32	29	42A	Right	UO	IDC	Former	No	21.8
7	50	35	33	40DDD	Left	UO	Mixed IDC	Never	No	2.8
8	52	22	24	36B	Right	UI	DCIS, IDC	Never	No	0.3
9	55	31	29	36C	Left	UO	ILC	Never	No	5.2

DCIS, ductal carcinoma in situ; IDC, invasive ductal carcinoma; ILC, invasive lobular carcinoma; UO, upper outer; UI, upper inner; LO, lower outer; LI, lower inner; U, unilateral; B/L, bilateral.

33 kg/m² (range 22–49 kg/m²). All patients presented with grade II or III breast ptosis. The average sternal notch-to-nipple distance (SNTND), recorded in eight patients, was 31 cm. Two patients required free nipple grafts (FNG) due to severe breast ptosis. One patient with a SNTND of 40 cm required unilateral FNG; the second had bilateral FNG with an average SNTND of 42 cm.

Table 2 summarizes the interval between oncoplastic reduction and NSM and method of reconstruction. The average interval between oncoplastic reduction and NSM of all patients was 15 weeks (3.6 months; range 8–29 weeks). When the three patients who received chemotherapy between oncoplastic reduction and NSM were excluded, the average interval between operations for the remaining six patients was 11.3 weeks (2.6 months; range 8–13 weeks).

The shortest interval between oncoplastic breast reduction, and NSM was 8 weeks seen in patient 3. The patient had severe breast ptosis with SNTND of 42 cm and at the time of oncoplastic breast reduction underwent bilateral FNG. The patient postoperatively developed mild nipple epidermolysis and triple point breakdown, which healed by conservative measures. Completion NSM was then performed at an 8-week interval with no postoperative complications.

At the time of NSM, eight patients (13 breasts, 93%) underwent pDTI reconstruction, and one patient (one breast, 7%) underwent immediate deep inferior epigastric perforator (DIEP) flap reconstruction. The average partial mastectomy weight, including margins at the time of oncoplastic breast reduction, was 340 g. The subsequent average mastectomy weight, including the contralateral breast, at the time of NSM was 593 g. Of the eight patients who received pDTI reconstruction, a majority had slightly larger implants compared with the respective mastectomy specimen. No patient required any revisional surgery such as fat grafting, implant exchange, or scar revision after NSM. Two patients required radiation post NSM for management of positive sentinel lymph nodes at the time of partial mastectomy. Long-term follow-up in the two patients was 2 months and 12.6 months, respectively. The first patient moved out of state prior to radiation treatment. The second had minor capsular contracture at 8 months post NSM.

In this series, there were no cases of nipple necrosis among the seven patients without FNG or in the two patients with FNG. Five patients (five breasts, 36%) had superficial epidermolysis of the nipple, which healed with conservative measures. One patient required takeback for hematoma after oncoplastic breast reduction (before mastectomy). One patient (one breast, 7%) required unplanned reoperation after NSM. The patient developed a persistent seroma around the implant/mesh construct, despite aspiration, requiring revision 1 month postoperatively. At the time of surgery, the patient was found to have mesh nonintegration and required mesh replacement, which was successful. Of note, all subareolar margins were negative. The average length of follow-up was 1.6 years (range 0.03–3.1 years).

Table 2. Interval between Oncoplastic Reduction and Method of Reconstruction

Patient	Mastectomy	Weeks between Reduction and NSM	Chemotherapy	Method of Reconstruction	Tissue Perfusion Assessment (SPY)	Dressing	Implant Size (cm^3)	Partial Mastectomy Weight (g) with Margins	Reduction Specimen Weight (g)	Left Breast Mastectomy Weight (g)	Right Breast Mastectomy Weight (g)
1	Unilateral		None	Deep inferior epigastric perforator	No	Prevena	NA	69	89	Unilateral	594
2	Bilateral	20	Neoadjuvant	pDTI	Yes	Prevena	800	517	935	1229	885
3	Unilateral	8	Adjuvant	pDTI	Yes	Prevena	800	108	1818	Unilateral	1254
4	Bilateral	21	Neoadjuvant	pDTI	Yes	Conventional	800	245	747	535	703
5	Bilateral	29	Neoadjuvant	pDTI	Yes	Bella	495	26	14	432	406
6	Unilateral	11	Adjuvant	pDTI	Yes	Bella	485	35	88	Unilateral	385
7	Unilateral	13	None	pDTI	Yes	Bella	650	230	540	686	Unilateral
8	Bilateral	12	None	pDTI	Yes	Bella	240	1720	155	189	202
9	Bilateral	11	Adjuvant	pDTI	Yes	Bella	520	109	382	374	440

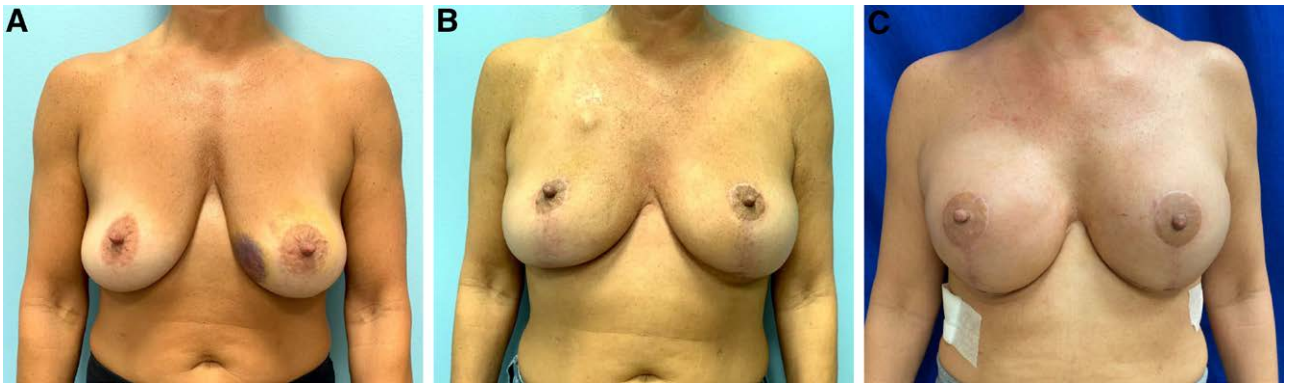

Fig. 1. Clinical photos, patient 5. A, Pre-oncoplastic breast reduction of patient 5 after core needle biopsy with left-sided breast cancer, grade II ptosis and a body mass index (BMI) of 22 kg/m^2. B, The patient 3 months postoncoplastic breast reduction. C, The patient 2 weeks post-NSM with pDTI breast reconstruction and placement of 495 cm^3 extra profile implants. The patient received chemotherapy between oncoplastic reduction and NSM, resulting in a 29-week interval between reduction and NSM.

Individual patient outcomes after oncoplastic breast reduction followed by NSM with single-stage pDTI breast reconstruction are shown below. Figure 1 shows patient images of patient 5 with a left-sided breast cancer showing pre-oncoplastic breast reduction, postoncoplastic breast reduction, and post NSM with pDTI reconstruction.

Similarly, Figure 2 shows patient images of patient 6 with a right-sided breast cancer showing pre-oncoplastic breast reduction, postoncoplastic reduction, and post-NSM. Placement of Prevena Restor BellaForm dressing is also shown in Figure 2C and was removed at the first post-operative visit.

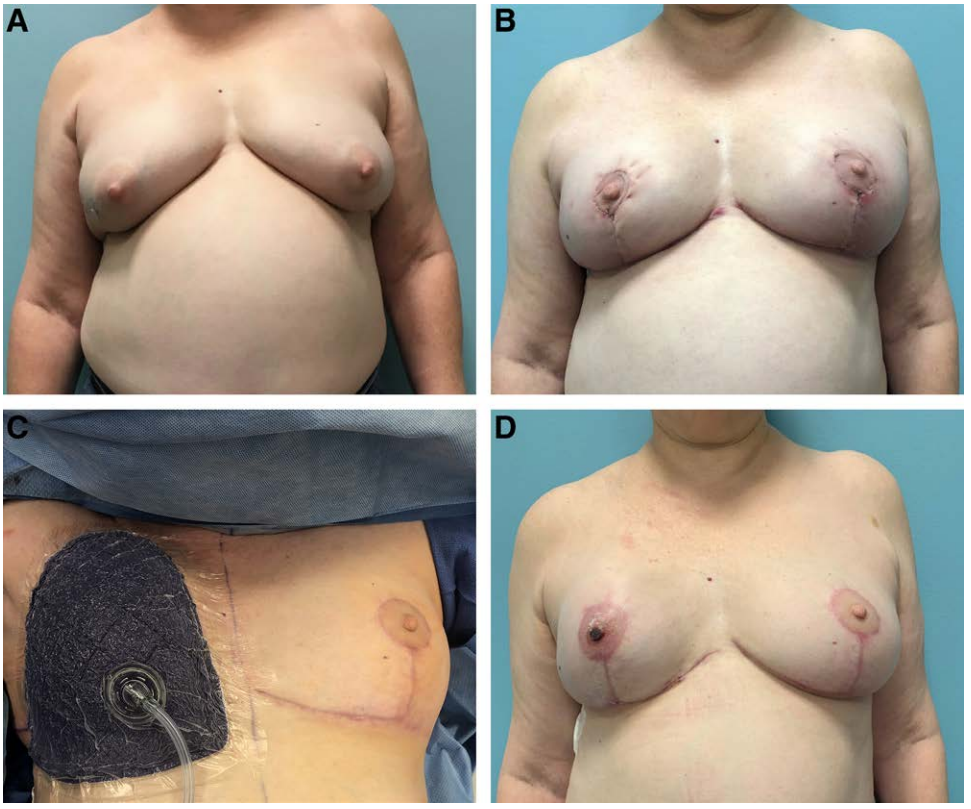

Fig. 2. Clinical photos, patient 6. A, Pre-oncoplastic breast reduction of patient 6 with right sided breast cancer, grade II ptosis, and BMI of 32 kg/m^2. B, Patient 6, 16 days postoncoplastic breast reduction. C, Patient 6 with placement of Prevena Restor BellaForm dressing which was removed at the first post-operative visit. D, Patient 6, 16 days post right NSM with pDTI breast reconstruction and placement of 485 cm^3 full profile implants. Interval of 11 weeks between breast reduction and NSM. Postoperatively, the patient developed mild right nipple epidermolysis, which healed by conservative measures.

DISCUSSION

We present a series of nine patients (14 breasts) who underwent NSM after lumpectomy with oncoplastic breast reduction; in eight patients (12 breasts) the staged NSM was performed due to positive lumpectomy margins and thus was unplanned. Our series expands on prior studies by demonstrating that pDTI reconstruction can be offered safely with a shorter intersurgery interval, low complication rate, and without compromise to the NAC.[3,4,6,7] In contrast to prior studies in which the majority of staged NSMs were in the setting of prophylaxis, most patients in our cohort had an underlying diagnosis of breast cancer and underwent an unplanned staged NSM.

For patients with an unanticipated positive margin, re-excision may be feasible in appropriately selected patients, and we have previously published our experience with margin re-excision after lumpectomy with oncoplastic breast reduction.[8] During the study period, our rate of conversion from lumpectomy with oncoplastic breast reduction to mastectomy in patients with a residual positive margin was 4.3%.[8] Our overall rate of successful breast conserving therapy, for patients who undergo partial mastectomy with oncoplastic breast reduction/lift, is 95%, an acceptable rate considering that many of these patients have large tumors and would not be candidates for an attempt at breast conservation without a concurrent oncoplastic procedure.[8]

Although some patients will be candidates for margin re-excision if there is a positive margin after lumpectomy with an oncoplastic breast reduction/lift, some patients will undergo mastectomy instead. If there is a positive margin despite a large lumpectomy specimen, the breast surgeon may feel there is a high residual tumor burden, making re-excision unlikely to be successful. Furthermore, extensive tissue rearrangement at the time of breast reduction may leave uncertainty for the surgeon as to the location of the residual margin. The size of the reconstructed breast after reduction must also be considered. If the reconstructed breast is too small to undergo further volume reduction, mastectomy should be recommended. Some women may also elect for mastectomy for further risk reduction, avoidance of potential radiation, or to avoid the possibility of a third oncologic surgery.

Several previous studies have addressed staged mastopexy or reduction to prepare the large and/or ptotic breast for NSM. In 2013, Alperovich et al reported outcomes in 13 breasts with a remote history of breast reduction that subsequently underwent NSM. Although there was no nipple loss or flap necrosis, the interval between operations was significantly longer at 51.8 months, and all patients with implant-based reconstruction had placement of tissue expanders initially.[4]

Spear et al in 2012 reported outcomes in 24 breasts undergoing staged NSM, with most breasts undergoing placement of tissue expanders after mastectomy.[3] Although not explicitly stated, these were likely all in the sub-pectoral position, given the date of the report. Of those, five patients (five breasts) had a diagnosis of cancer and underwent therapeutic NSM. Two patients received interval chemotherapy between planned mastopexy and NSM. The overall interval was 4.4 months between reduction and NSM and 2.6 months when excluding the two patients who underwent chemotherapy.

Other approaches to staged NSM in patients with macromastia have been described using vascular delay techniques.[9–11] The vascular delay phenomenon, also referred to as ischemic preconditioning, is a technique in which the dominant or adjacent blood supply to a flap is divided to create partially ischemic conditions. The ischemic stress stimulates biochemical pathways to promote neovascularization and improved flap viability.[12] In the cases presented here, oncoplastic breast reduction can be seen as a form of vascular delay. While the dominant pedicle supplying the NAC remains intact, the nipple forms new vascular connections from the surrounding skin during nipple inset, which will serve as the primary blood supply at the time of NSM. Jensen et al employs a more traditional vascular delay technique by utilizing a "hemi-batwing" incision with creation of a skin flap of 4–5 cm beneath the NAC 7–21 days before NSM.[9] However, this approach has not been well described after recent Wise-pattern breast reduction. In another technique, known as "hybrid delay," patients undergo subtotal mastectomy with preservation of an inferior pedicle and nipple, with pre-pectoral expander placement.[10] After 3 months, patients return to the operating room; via the lateral limb of the Wise-pattern incision, the expander is removed, the inferior pedicle is excised, and reconstruction is performed with implant or autologous tissue.[10] Compared with the technique reported by Spear et al, surgical delay techniques offer the advantage of providing therapeutic resection earlier.

Another topic raised by our report is that of successful DTI reconstruction at the time of staged NSM. Economidies et al reported on 50 breasts undergoing staged NSM. Eight patients (16 breasts) underwent therapeutic NSM with an interval of 12 weeks; however, only four breasts underwent DTI at the time of NSM.[6] Our data support that DTI breast reconstruction can be done successfully at the time of NSM while maintaining adequate perfusion to the NAC.

Success in implant-based reconstruction after NSM is multifactorial. No patients in this series developed mastectomy flap or nipple necrosis, which, we believe, is attributable to breast and plastic surgeon experience, inframammary incision choice, appropriate flap thickness, intraoperative tissue perfusion assessment, and the use of a closed incision and surrounding soft tissue negative pressure incision management system. Incision choice can impact the subdermal blood supply to the nipple. Based on the literature and our experience, we recommend routine use of an inframammary incision, as peri-areolar incisions have been shown to have increased rates of nipple necrosis.[13] In our limited experience, attempts at NSM by dismantling the vertical limb of the previous Wise-pattern has shown worse wound-related complications, including NAC necrosis and, therefore, has been abandoned. We describe the use of an inferiorly-based pedicle at the time of oncoplastic breast reduction, and despite division of the pedicle at the time of NSM, there were no cases of nipple loss, suggesting that an inferiorly based pedicle is safe.

Precise intraoperative dissection is imperative for appropriate mastectomy flap thickness and minimizing risk of complications. Although there is variability in optimal flap thickness, there are data demonstrating increased complications with flaps less than 8 mm.[14] At our institution, all mastectomies are performed by dedicated oncologic breast surgeons, which is felt to play a role in overall low rates of flap necrosis. No patients had flap necrosis or dehiscence in our cohort. The oncologic surgeon should be aware that the reduction plane, having been performed by the plastic surgeon, is often thicker than the oncologic mastectomy plane. Attention should be paid to appropriate flap thickness to ensure an oncologically sound NSM procedure. Obviously, the thickness of these flaps is a double-edged sword: too thick of a flap may predispose to recurrences, whereas too thin of a flap may lead to amplified rippling and inadequate perfusion, which can cause necrosis, dehiscence, and poor mesh integration.

Routine assessment of intraoperative tissue perfusion with indocyanine green angiography helps guide decision-making regarding flap viability.[15] Tissue perfusion is always assessed with a cosmetically optimal sizer in place. Perfusion can be assessed visually and measured as a percentage of signal intensity based upon a reference point set by the operator to determine if areas of the flap or NAC are at a high risk of ischemia. Before mastectomy, patients must be informed of the possibility of NAC resection if it is found to have complete ischemia, or at a later procedure if it fails to improve clinically with supportive care. Figure 3 shows patient 5 with left-sided breast cancer and excellent tissue perfusion assessment (SPY; SPY Intraoperative Perfusion Assessment System, LifeCell Corp., Branchburg, N.J.) at the time of NSM with placement of 495 cm^3 sizers. The weight of the mastectomy specimen was 432 g with placement of 495 cm^3 extra full-profile silicone implants. The interval between oncoplastic breast reduction and NSM was 29 weeks.

Real-time assessment of tissue perfusion allows for DTI reconstruction when expanders may have otherwise been utilized reflexively. The ability to forgo routine use of expanders keeps patients from undergoing another surgery for placement of permanent implants, in addition to time saved from multiple clinic visits to undergo expansion. Immediate implant placement also allows the surgeon to avoid complications associated with exchange of expander to implant after radiation. Of note, if post mastectomy radiation is planned, the breast involved with cancer is left slightly larger than the contralateral side to accommodate for subsequent radiation; however, radiation is often avoided should women undergo an interval mastectomy.

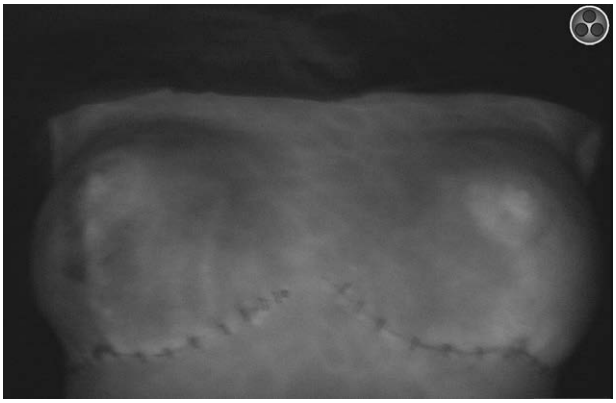

Fig. 3. Laser angiography using indocyanine green. Patient 5 with left sided breast cancer and on table tissue perfusion assessment (SPY) with placement of 495 cm^3 sizers. Left breast mastectomy weight was 432 g with subsequent placement of 495 cm^3 extra full profile silicone implants. Interval of 29 weeks between oncoplastic breast reduction and NSM.

Negative pressure incisional management systems have been shown to decrease the rates of infection, dehiscence, mastectomy flap necrosis, and seroma formation.[16,17] We believe that the expanded coverage area of closed incision and surrounding soft tissue negative pressure therapy may further decrease postoperative complications and improves our cosmetic results. While traditional closed-incision negative pressure management systems cover the incision and a narrow portion of adjacent skin, the increased coverage area of the Prevena Restor BellaForm dressing, as shown in Figure 2C, supports both the incision and surrounding soft tissue to potentially decrease complications.[18] Additionally, we value this system because it helps mold the shape of the breast, maintain the position of the NAC on the breast mound, and improve perfusion to the NAC. It is the institutional standard that all patients undergoing implant-based breast reconstruction have each implant covered with a Prevena Restor BellaForm dressing. Because we use the negative pressure incision management system routinely, it is not possible for us to compare outcomes between patients who are managed with and without this technique.

The minimum feasible interval between oncoplastic breast reduction and NSM for high-risk patients remains unknown. Although a longer interval from breast reduction to NSM presumably protects against many complications, the minimum and optimal interval and surgical outcomes must be weighed against the oncologic risk of treatment delay. From an oncologic standpoint, it is ideal if systemic therapy can be administered during the interval between operations. When chemotherapy is recommended after initial oncoplastic surgery, this can be administered before NSM to avoid delays in systemic therapy. Additionally, chemotherapy administration before NSM allows additional time for healing and development of sufficient vascular regrowth to the NAC.

When neither chemotherapy nor radiation is planned, consideration may be given to antiestrogen therapy between oncoplastic reduction and NSM. Of note, only one of our patients had invasive cancer (invasive lobular carcinoma) at a positive margin. We believe that oncologic safety should be a primary consideration when determining whether to perform NSM for positive margin after oncoplastic breast reduction; patients selected for this approach ideally will be candidates for interval chemotherapy or endocrine therapy and have only ductal carcinoma in situ at the mastectomy margin. Another option, which we do not have experience with, would be employing the

surgical delay techniques discussed above[9,10]; this would have the benefit of obtaining clear margins 1 to 2 weeks after oncoplastic breast reduction, but the disadvantage of committing to three rather than two operations. Notably, routine pDTI reconstruction as was done for most of our patients avoids a planned third surgery.

The main limitation of this study is the small cohort size. The limited sample size is felt to be in part from lower rates of positive margins after oncoplastic breast reduction. With concurrent breast lumpectomy and oncoplastic breast reduction, larger margins can be achieved than would be possible with lumpectomy without oncoplastic breast reduction. For women with a single positive margin without significant tissue rearrangement at the time of oncoplastic breast reduction, margin re-excision may be feasible.[9] Two patients required FNG at the time of oncoplastic breast reduction. We understand perfusion to the NAC via a nipple graft is a very different phenomenon than perfusion from the underlying pedicle, and a known limitation in considering the nipple viability outcomes of our study. Future studies with larger patient cohorts are needed to better define the optimal and minimum feasible intervals between breast reduction and NSM.

CONCLUSIONS

For women with large and/or ptotic breasts, several prior studies have focused on planned staged reduction mammoplasty followed by NSM, often in the setting of cancer risk reduction.[3,4,6,7,11] We focused specifically on patients with underlying breast cancer who were committed to prepectoral DTI breast reconstruction at the time of NSM. The results from our experience demonstrate that NSM after previous Wise-pattern breast reduction can be offered safely, even when initial intent was for breast conservation. For patients undergoing unplanned staged therapeutic NSM, we present improved outcomes and shorter interval between operations compared with previously published reports of planned staged NSM. To our knowledge, this is the largest series of pDTI breast reconstruction in women undergoing unplanned NSM after oncoplastic breast reduction. Despite tension placed on the NAC, pDTI reconstruction can be offered safely at the time of staged NSM, reducing the number of total operations from three to two.

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