

Nipple-Sparing Mastectomy and Immediate Free-Flap Reconstruction in the Large Ptotic Breast

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Abstract: Because of increased risk for nipple necrosis, many surgeons believe large ptotic breasts to be a relative contraindication to nipple-sparing mastectomy (NSM). A retrospective review was performed on 85 consecutive patients who underwent NSM with 141 immediate perforator free-flap breast reconstructions. We analyzed the subset of patients with large ptotic breasts, defined as cup size C or greater, sternal notch to nipple distance greater than 24 cm and grade 2 or 3 breast ptosis. Of the 85 patients, 19 fit the inclusion criteria. Breast cup size ranged from 34C to 38DDD. There was 1 case of nipple necrosis in the patient with previous breast radiation (5%), 1 hematoma (5%), and no flap losses. Five (26%) patients underwent subsequent mastopexy or breast reduction, a mean of 6.6 months after the primary procedure. We demonstrate that NSM and free-flap breast reconstruction can be safely and reliably performed in selected patients.

Key Words: nipple-sparing mastectomy, breast ptosis, free-flap breast reconstruction

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Since the 1970s, when Halsted true radical mastectomy was shown to be oncologically equivalent with less-deforming procedures, there has been a consistent trend in breast surgery toward mastectomies that preserve more of the outer envelope of the breast to optimize the ultimate reconstruction. Nipple-sparing mastectomy (NSM), the most recent version of this concept, has been shown to be a safe option in both prophylactic and cancer settings with low rates of recurrence and complications.^{1–3} There are several favorable reports of breast reconstruction with NSM in both implant-based and autologous reconstruction,^{4–5} and there is a growing consensus in the plastic surgery community that NSM provides a superior aesthetic outcome both because of the preservation of the entirety of breast skin and the retention of the nipple-areola complex.

There are currently accepted oncologic criteria that would prevent a patient from being a candidate for NSM, including skin involvement of the tumor, distance from the tumor to the nipple, and size of the tumor.³ However, there is no consensus as to the “anatomic” or reconstructive criteria for NSM, that is, whether a breast must be less than a certain size or nonptotic to even consider performing the operation. Large breast size (greater than 500 g) or ptoses have been proposed as contraindications to NSM.³ Spears

et al⁶ recommend performing a mastopexy or reduction preoperatively to preserving blood supply to the nipple-areola complex (NAC). This, unfortunately, delays the patient’s oncologic resection and may add to their preoperative anxiety. Others suggest performing the mastopexy simultaneously with NSM and implant-based reconstruction, potentially jeopardizing nipple viability in large ptotic breasts.^{7–9} Verheyden¹⁰ recommended using hyperbaric oxygen as an adjunct for treating NSM flaps in patients with large and ptotic breasts. We examined our experience with NSM in patients with large and ptotic breasts who underwent perforator free-flap reconstruction to determine the reconstructive safety and reliability of this procedure. We also present 3 cases of patients who had either a single-stage NSM with reconstruction or an additional second-stage mastopexy.

MATERIALS AND METHODS

Between December 2008 and March 2011, a total of 327 patients underwent breast reconstruction by a single senior plastic surgeon. Of these patients, 85 underwent NSMs. A retrospective chart review was performed on all NSM patients to separately analyze all patients with large ptotic breasts. Large ptotic breasts were defined as cup size C or greater, sternal notch to nipple distance greater than 24 cm, and grade 2 or 3 breast ptosis. Patients had to meet all 3 criteria to be included in the review.

Risk factors examined included any significant medical comorbidities, body mass index (BMI), and previous breast radiation. Oncologic and reconstructive operative techniques, occurrence, and timing of secondary procedures and complications, including nipple necrosis, hematoma, and partial or total flap loss, were examined.

RESULTS

Patient Characteristics

Of the 85 patients who underwent NSM, 19 fit the inclusion criteria (n = 19). Breast cup size varied from 34C to 38DDD. Sternal notch to nipple distance averaged 26.8 cm (range, 24–28.5). Mean patient age was 47.4 years (range, 35–61). Mean BMI was 26.8 (range, 21.6–32), and 3 (15%) of 19 patients had BMI greater than 30. Of the 19 patients, 10 (50%) underwent prophylactic mastectomies for a strong family history of breast cancer or positive genetic testing for BRCA 1 and 2. No patients had significant medical comorbidities, including diabetes or smoking history. Only 1 patient had previous breast radiation before NSM.

Operative Characteristics

Of the 19 patients, 15 (79%) had bilateral NSM; 4 (21%) had unilateral NSM after having had a previous contralateral mastectomy for breast cancer; 13 (68%) through vertical incisions from the nipple toward the inframammary fold, and 6 (32%) had NSM through lateral incisions from the nipple toward the axilla. Intraoperative frozen section of subareolar tissue was performed for all NSM with subsequent permanent pathologic analysis. All specimens were negative for carcinoma and no patients required subsequent re-excision of the NAC. The mean weight of the mastectomy specimen was 598 g (range, 370–876 g).

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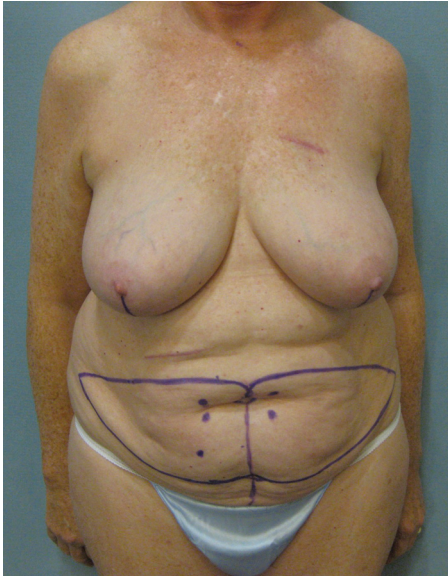


FIGURE 1. Case 1, preoperative photograph with markings.

Of the 19 patients, 1 (5%) underwent a bilateral TUG flap reconstruction; the remaining 18 (95%) had bilateral DIEP flap reconstruction. The mean flap weight was 586 g (range, 295–1012 g). There was 1 (5%) case of nipple necrosis, 1 (5%) hematoma, and no partial or complete flap losses. Five (26%) patients underwent subsequent mastopexy or breast reduction to tailor the skin envelope to the underlying free flap. Secondary procedures were performed a mean of 6.6 months after the primary procedure (range, 4–10).

CASE 1

The patient was a 61-year-old woman with a BMI of 27, breast cup size of 36DD, and grade 2 ptosis. Her right sternal notch-nipple distance was 27 cm, and left, 28 cm (Fig. 1). She underwent bilateral prophylactic NSM through vertical incisions with bilateral DIEP flap reconstruction. Her mastectomy weights were 697 (right) and 625 g (left), and the flap weights, 644 (right) and 631 (left) g.



FIGURE 2. Case 1, postoperative photograph.



FIGURE 3. Case 2, preoperative photograph with markings.

She required only a single-stage reconstruction and was satisfied with the result (Fig. 2).

CASE 2

The patient was a 47-year-old woman with a BMI of 24, breast cup size of 36 DD, and grade 2 ptosis. Her sternal notch-nipple distance was 28 cm bilaterally (Fig. 3). She underwent bilateral NSM through vertical incisions for right breast DCIS and contralateral prophylaxis with bilateral DIEP flap reconstruction. Her mastectomy weights were 462 (right) and 402 g (left), and the flap weights, 438 (right) and 432 (left) g. Figure 4 shows an immediate postoperative result. She subsequently underwent a bilateral mastopexy as a second-stage 4 months after her initial surgery (Fig. 5).

CASE 3

The patient was a 51-year-old woman with a BMI of 26, breast cup size of 34C, and grade 2 ptosis. Her right sternal notch-nipple distance was 27.5 cm, and left, 28.5 cm (Fig. 6). She underwent bilateral prophylactic NSM through vertical incisions with



FIGURE 4. Case 2, immediate postoperative photograph.



FIGURE 5. Case 2, photograph after secondary mastopexy.

bilateral DIEP flap reconstruction. Her mastectomy weights were 645 (right) and 575 g (left), and the flap weights, 620 (right) and 615 (left) g. Figure 7 shows her postoperative result. She subsequently underwent a bilateral breast reduction as a second stage with 80 g resected per breast 9 months after her initial surgery (Figs. 8 and 9).

DISCUSSION

As surgeons worldwide gain more experience with NSM, there will likely be a continued trend toward an increasing preference for NSM both by patients and surgeons. In long-term outcome studies, most patients were satisfied with NSM and would choose



FIGURE 7. Case 3, postoperative photograph.

it again.¹¹ The primary goal of the reconstructive surgeon has always been to mitigate the severity of the patient’s defect, regardless of its origin. We have found that NSM is a reasonable reconstructive option in patients with large ptotic breasts with a low rate of nipple necrosis. Our rate of nipple necrosis is comparable to other large reviews of NSM patients,^{3,12} demonstrating the reliability of this technique in this patient population. Importantly, our single case of nipple necrosis occurred in a patient who had previously undergone breast radiation, itself a significant risk factor for mastectomy flap necrosis.¹³

We have also found secondary mastopexy or breast reduction to be a useful adjunct to NSM. There are several reports in the literature that recommend performing a mastopexy or reduction at a separate surgery before the mastectomy³ or simultaneously with the mastectomy.⁷⁻⁹ We believe that delaying the oncologic resection is unnecessary for these patients. Adding the complexity of a breast reduction makes the free-flap case longer and may compromise nipple viability, especially in a large and ptotic breast. Patients undergoing free-flap breast reconstruction often have secondary



FIGURE 6. Case 3, preoperative photograph with markings.



FIGURE 8. Case 3, markings for secondary breast reduction.



FIGURE 9. Case 3, photograph after secondary breast reduction.

outpatient procedures, whether to revise the reconstruction or the abdominal scar. In patients with large ptotic breasts, these mastopexies can be done simultaneously. This avoids the issues associated with reducing the breast before NSM, which delays the oncologic resection and potentially exacerbates the anxiety that may already be present in this patient population.

We have not yet found an upper limit to size or sternal-notch to nipple distance in NSM. However, there is an important caveat. The breast oncologic surgeon must understand and respect the difference between breast subcutaneous tissue and breast parenchyma to preserve the blood supply to the breast skin and NAC, especially the second intercostal perforator (A. J. Stolier, personal communication). Other aspects of technique include incisions that do not circumferentially surrounding the nipple (such as the vertical and lateral incisions described previously), minimal use of electrocautery, and no dissection far beneath the inframammary fold, lateral to the latissimus or over the sternum.¹⁴ As many reconstructive surgeons are well aware, techniques that do not respect the blood supply to the breast skin and create excessively thin flaps will be plagued by a high incidence of mastectomy-flap necrosis regardless of nipple preservation or breast size.

Our patient population was also favorable for NSM. We had no patients with a history of smoking or diabetes and only a small percentage of obese patients, factors that have been shown negatively to impact rates of mastectomy skin flap necrosis.^{15–17} Patient selection is an important criterion for NSM. However, having large and ptotic breasts alone should not preclude patient from access to this potentially beneficial procedure.

SUMMARY

Although many surgeons believe large ptotic breasts to be a relative contraindication to NSM, we demonstrate that NSM and free-flap breast reconstruction can be safely and reliably performed in selected patients. Nipple loss is rare, and secondary mastopexy or reduction procedures are only required in a minority of patients.

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