

A Novel Approach to the Management of Margin-positive DCIS in Nipple-sparing Mastectomy

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Summary: Nipple-sparing mastectomy (NSM) is gaining acceptance as an oncologically sound and cosmetically superior mastectomy technique. Debate exists over the management of positive margins near the nipple-areola complex. This case report presents a novel approach to the management of margin-positive ductal carcinoma in situ in NSM. A 50-year-old white female with invasive ductal carcinoma underwent NSM. Intraoperative pathology indicated the presence of DCIS-positive retroareolar margins. Revision through a direct vertical nipple incision allowed for adequate surgical revision and pathologic evaluation of the retroareolar breast tissue while maintaining the nipple-areola skin and primary mastectomy incision. This novel approach ensures negative margins, allows superior cosmetic outcome, and improves patient autonomy in decision making. The technique may translate to NSM patients with positive retroareolar margins or false-negative margins. (*Plast Reconstr Surg Glob Open* 2014;2:e253; doi: 10.1097/GOX.000000000000189; Published online 18 November 2014.)

Breast cancer is the most prevalent cancer affecting women in the United States.¹ Surgical treatment of breast cancer has evolved from the radical mastectomy, now rarely performed, to progressively less invasive procedures. Advancements in resection management have allowed for improved cosmetic considerations; of note is the recent growth in popularity of the nipple-sparing mastectomy (NSM).

The NSM developed as a natural extension of the skin-sparing mastectomy (SSM). NSM conserves the nipple-areola complex (NAC) in addition to the typical SSM tissue. The SSM is generally regarded as an oncologically safe procedure,^{2,3} and the NSM is generally considered oncologically acceptable as long as the NAC margin is clear.^{2,4,5} NSM is typically

converted to SSM if the retroareolar margin is positive although the technique of nipple inversion with removal of all glandular tissue during primary resection has been described.⁶ The main complication of NSM is nipple tissue necrosis.^{2,3} Positive retroareolar margin is a risk factor for NAC necrosis.³

Reservation toward conserving the NAC stems from the observation that the NAC is capable of harboring occult cancer.⁵ Involvement rate has been shown to range from 0% to 58%.⁵ The use of frozen section in identifying retroareolar pathology is highly sensitive, specific, and accurate; false-negative frozen section results are uncommon, and local-regional recurrence has been demonstrated to be low in these false-negative cases.⁷ It should be noted, however, that debate exists over the definition of clear margins^{8,9} and the significance of the predictive value for positive margins on local-regional recurrence or patient survival.^{8,10}

Cosmetically, patients are more satisfied with NSM.^{2,5} Patients who undergo NSM have been shown to rate their self-image and quality of life positively.^{2,3} NSM also allows for preservation of innervation to the NAC, permitting retention of nipple function and sensation.²

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This case report elaborates an original, more conservative surgical technique for the management of positive retroareolar margins in the NSM.

CASE REPORT

A 50-year-old white female with a history of breast cancer was diagnosed with biopsy-confirmed cancer of the right breast (Fig. 1). She elected to undergo bilateral NSM with immediate primary reconstruction.

On intraoperative pathologic examination, left breast pathology was nonmalignant. Initial right breast pathology indicated grade II infiltrating ductal carcinoma associated with extensive ductal carcinoma in situ extending into the subareolar tissue. Mastectomy margins were uninvolved by invasive carcinoma; however, the anterior retroareolar margin was positive for DCIS. A second cut of tissue from the superior margin of resection remained positive for DCIS on frozen section.

This patient had clearly expressed her strong desire to retain the nipple, so after consult with her husband about the pathology reports, the planned bilateral primary reconstruction was performed through the vertical operative incision. Spectrum 375-cm³ saline implants were placed above the pectoralis major muscle and secured with a sheet of acellular dermal matrix (FlexHD pliable, Musculoskeletal Transplant Foundation, Edison, NJ.). On follow-up, the pathology reports and typical management (surgical removal of the involved NAC) were discussed with the patient. She desired to retain her right nipple, yet desired for all cancerous tissue to be removed.

For optimal management, we elected to retain the nipple skin while removing any residual breast glandular tissue via direct vertical incision of the NAC. Vertical incision was chosen to minimize disruption of blood flow to the nipple. An incision was made through the NAC to the acellular dermal matrix (Fig. 2). The base of the NAC was excised and submitted for frozen sec-

tion. Next, all remaining glandular tissue was excised from the medial and lateral margins of the NAC, leaving only skin. Frozen section results for all specimens were negative. A drain was placed in the pocket and brought out through the skin; platelet rich plasma was placed in the pocket, and the incision was closed with 5-0 interrupted nylon sutures (Fig. 3).

Six days postoperatively, the nipple remained satisfactorily intact with no necrosis and good cosmesis (Fig. 4). Additionally, the initial reconstruction healed well with no complications.

DISCUSSION

Our approach to this patient's management:

- allowed for definitive cancer resection while maintaining exceptional cosmetic result;
- was not complicated by nipple necrosis;
- preserved bilateral cosmesis;



Fig. 2. Right nipple: incision down to acellular dermal matrix, illustrating good visualization of the subareolar tissue.



Fig. 1. Before NSM: vertical scars from previous right lumpectomy and bilateral mastopexy are noted.



Fig. 3. Closure of the right nipple after tissue removal: the nipple has been reapproximated with good cosmesis and nipple viability noted.



Fig. 4. Final Result at 3 months. A, Front. B, Oblique. C, Front, no animation deformity.

- left the original operative wound intact;
- was performed under local anesthesia;
- can be performed after initial reconstruction;
- allowed for increased patient autonomy;
- is applicable to patients with false-negative frozen section margins who desire more definite cancer management.

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This case is unique because we establish a method through which the NAC skin may be conserved while removing residual breast tissue. This method is particularly unique in that it allows for the NAC-sparing mastectomy to be secondarily converted to a NAC-skin conserving mastectomy. Any residual breast tissue is immediately adjacent to the skin, promoting ease of examinability, detection of recurrent disease, and removal of pathologic tissue.

The vertical incision allows superior visualization of the NAC tissue without reopening the mastectomy incision, without causing excessive manipulative tissue trauma, and without significant disruption of blood supply. Blood supply to the NAC is derived from the external and internal mammary arteries; these arteries branch horizontally to transverse the subcutaneous tissue, communicating above and below the areola. Small branches from these communicating vessels ascend and give off branches to the skin.¹¹ The vertical incision cuts perpendicular to the anastomotic tributaries and cuts parallel to the skin-supplying branches, allowing for minimal disruption of arterial supply and maximal opportunity for overlapping watershed supply to support any devascularized areas.

CONCLUSIONS

Revision of the NSM through a direct vertical incision allows for adequate surgical revision and pathologic evaluation of the retroareolar breast tissue while maintaining the NAC skin and primary operative incisions. This approach ensures negative margins, enables a superior cosmetic outcome, and improves patient autonomy. The technique is applicable to NSM patients with positive retroareolar margins and NSM patients with false-negative frozen section margins.

PATIENT CONSENT

The patient provided written consent for the use of her image.

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