Nipple Skin-Sparing Mastectomy: Patient Selection and Technique

BRCA mutations or other genetic susceptibility genes.

Premenopausal patients especially with bilateral breast cancer should be considered at high risk of carrying a gene. Patients with breast cancer and a family history of breast and ovarian cancer have a ~40% risk of BRCA 1 and 2 mutation. When the patient or relative has a breast cancer and ovarian cancer in the same patient, that patient has ~80% risk of carrying a mutation. Thyroid, uterine, colon and breast should be tested for the PTEN gene for suspected Cowden’s syndrome. Li-Fraumeni Syndrome (mutation in p53 or CHEK2) includes breast cancer associated with a family history sarcoma, leukemia, brain cancer and adrenal cortical tumors.

A discussion of risk benefit of prophylactic mastectomies and reconstruction as well as alternative strategies should be discussed with the patient. Screening with MRI as well as mammography and US as well as prevention with tamoxifen may provide a similar benefit with alternative risks to mastectomy and reconstruction. Patients should be aware that mastectomy provides only a 90% risk reduction. Prophylactic mastectomy provides little benefit statistically after the age of 60.

In addition dependent on the mutation, regular screening for other cancers should be advised.

Strong family history without a genetic mutation

Familial syndromes that can increase include breast cancer in multiple first-degree relatives and in multiple generations of family members with breast and/or ovarian cancer (family cancer syndrome or Hereditary breast-ovarian cancer syndrome (HBOC)). Patients should be tested for a gene when there is more than a 5% risk of having one. There are several Gene Carrier Risk Status Prediction models that can be used to estimate such a risk including: BOADICEA, BRCAPRO, BRCA risk calculator, as well as ones that are directed at specific populations. The Claus model can be helpful in estimated risk when there is an extended group of second degree relatives.

Histologic risk factors

Absolute Risk Prediction Models can be used to determine a patient’s personal risk of breast cancer including the Gail that looks at risk by first degree relative, age, age at menarche and reproductive history and history of atypia or LCIS or the Gail model adapted for African Americans (CARE) or the Tyer-Cuzick Model. Triple negative breast cancer in a woman younger than 60 years of age has as much as a twenty percent risk of carrying a BRCA 1 or 2 genes even with no family history.

Difficult surveillance

Mammographically dense breast can also carry an increased risk of breast cancer and there are several models that include this in their risk calculations. Diffuse calcifications can make surveillance difficult. Physical exam can be difficult in patients with dense breast and multiple cysts. Ultrasound screening of such breast is not routine but can be helpful. Patients with multiple biopsies will opt for mastectomy versus repeated screenings and procedures.
INDICATIONS FOR PROPHYLACTIC CONTRALATERAL MASTECTOMY

Contralateral prophylactic mastectomy (CPM) should be considered and discussed with a patient with a current or previous diagnosis of breast cancer. CPM reduces the risk of breast cancer by 91-96%. Not necessary to recommend one but so the patient knows the information on which she can make a decision. Considerations include risk reduction, difficult surveillance, cancer phobia, reconstructive symmetry and balance. Although controversial some have claimed improved survival with contralateral mastectomy. However, to minimize the risk of regret in women considering contralateral prophylactic mastectomy – risk and benefit of a contralateral breast cancer and screening alternatives should be considered. Risk of contralateral breast cancer can be higher in patients with multicentric and inflammatory breast cancer.

TECHNIQUE OF NIPPLE SKIN-SPARING MASTECTOMY (NSSM) WITH IMMEDIATE RECONSTRUCTION

The deciding factors between an SSM versus NSSM was NAC involvement, breast size, and ptosis. Absence of NAC involvement by malignancy on clinical examination or preoperative imaging studies (mammography, ultrasound, or MRI) was sufficient evidence to proceed with NSSM. The final decision between NSSM and SSM was made intraoperatively based on histologic assessment of the nipple core. Cases for which the touch preparation was positive for malignancy were immediately converted to SSM, with removal of the NAC. Those with inconclusive or negative intraoperative assessment were spared until the final pathology result confirmed malignant involvement. Patients for which positivity of the nipple core was confirmed on final pathology were then taken back to the operating room for NAC skin removal.

Overly pendulous breasts, for which preservation of the NAC would lead to a cosmetically unappealing result or when the patient desired a reduced breast size, were treated with an elliptical incision, vertical or horizontal, or removal of the lower pole of the breast skin and NAC so that the final incision lay along the inframammary fold or a reduction mammoplasty scar (i.e. inverted “T”).

As previously reported, our initial experience with NSSM was through an inframammary incision. However, in consideration of the best scar to preserve all of the blood supply to the skin of the breast, we used the previous scar, the axillary scar, radial scars, and our preferred scar, a vertical infra-areolar incision. The incision is made from the areola limbus to the inframammary fold, variably extending from 4 to 8 cm in length, centered at the nipple in the sitting position. Patients with previous scars of reduction mammoplasty can have NSSM and in fact.¹⁷

Patients with a previous surgical scar allowing appropriate access for the mastectomy had the procedure completed through the same incision. If the location of the scar would not allow good exposure (medial), then a new incision was made. In those patients in which the NAC was excised and who did not have a previous scar, a circumareolar or lollipop incision allowed for excellent exposure.
In a recent review of the literature, Mallon et al suggested that there was strong evidence that NSSM was suitable for low to intermediate grade lesions that are well circumscribed single or multifocal lesions that have a tumor-to nipple distance >2cm, do not have lymphovascular invasion or axillary node metastasis. Others have shown that more aggressive and larger lesions after neoadjuvant chemotherapy can be candidates maintaining good cosmesis even after radiation therapy.

**Sentinel lymph node injection**

Sentinel lymph node biopsy was indicated for all patients with invasive ductal carcinoma and for patients with ductal carcinoma in situ that was larger than 5 cm, multifocal, or forming a mass. We perform intraoperative subareolar injection of unfiltered technetium-99m sulfur colloid (Cardinal Health) after induction of anesthesia. In our first few patients, we also used isosulfan blue dye in the breast. Because of skin flap necrosis at the site of the blue dye injection and permanent staining of the skin, we stopped using it and performed single-agent mapping with technetium-99m sulfur colloid. Most recently, we used the blue dye for axillary reverse mapping in which the blue dye is injected in the arm to map and preserve the lymphatics draining the arm within the axilla.

**Mastectomy procedure**

After the skin incision of choice is made, the creation of skin flaps is facilitated by developing the dissection plane with serial dilation using cervical Pratt dilators. Gentle pressure allows progressive dilation to bluntly dissect the plane between the breast and subcutaneous tissue, leaving a relatively avascular plane. The only exception applies to the skin overlying the NAC. A cold blade or scissors are used to sharply separate the overlying skin from the breast tissue. We aim leaving dermis only in order to completely remove the breast ductal system. A nipple core biopsy is taken from underneath the nipple skin and sent intraoperatively for frozen section, to rule out NAC involvement. The nipple core biopsy also was sent for permanent evaluation. Patients with a positive NAC margin are resected. The breast was delivered en bloc and oriented for the pathologist with sutures and ink in the NAC. Botox and a mixture of 0.5% bupivacaine and 1.5% lidocaine were injected in the pectoralis major muscle to reduce postoperative pain, decrease hospital stay, and facilitate expansion of the muscle. Patients with small breast can undergo immediate implant placement or tissue reconstruction. Those patients reconstructed with tissue expanders undergo several expansion sessions over several months. Once the desired volume was reached, the expanders are exchanged for a definitive saline or silicone implant.

**REFERENCES**


