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ADVANCES IN SURGERY

Nipple-Sparing Mastectomy

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Keywords

• Nipple-sparing mastectomy • Breast cancer • Risk reduction

Key points

- Today's nipple-sparing mastectomy (NSM), also called total skin-sparing mastectomy, preserves the entire skin envelope of the breast and includes standard, complete excision of breast tissue.
- Results to date have found NSM oncologically safe for risk reduction and cancer treatment.
- The central reason for preservation of the nipple is to improve the cosmetic outcome over what could be achieved with skin-sparing mastectomy and nipple reconstruction.
- Experience to date has found favorable patient satisfaction measures after NSM for cancer treatment or risk reduction.

BACKGROUND

Preservation of the nipple during mastectomy provides a superior cosmetic result compared with nipple excision and reconstruction. Today's nipple-sparing mastectomy (NSM), also called total skin-sparing mastectomy, preserves the entire skin envelope of the breast and includes standard, complete excision of breast tissue and removal of axillary nodes. Experience to date has found favorable patient satisfaction measures after NSM for cancer treatment or risk reduction. Howard and colleagues [1] found that patient satisfaction with breast appearance and overall psychosocial well-being were actually higher after NSM with reconstruction than at the preoperative, baseline

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assessment. When Metcalfe and coworkers [2] compared outcomes among NSM and skin-sparing mastectomy patients 4 years after surgery, NSM patients had higher satisfaction with their reconstructed breasts and higher sexual well-being scores compared with skin-sparing mastectomy patients.

NSM was initially explored when immediate breast reconstruction became possible but was largely abandoned in the 1980s because of concerns about the oncologic safety of preserving the nipple [3].

More recently, with an increasing number of women choosing bilateral mastectomies for breast cancer risk reduction and treatment, there has been renewed interest in nipple-sparing options. The safety of skin-sparing mastectomy techniques that remove only the nipple and areola have been established [4]. There are also a few reports of areola-sparing mastectomy techniques that remove the nipple but preserve the pigmented areola skin [5]. Skin-sparing approaches, although technically challenging, have become standard of care for most surgeons who regularly perform breast surgery. Development of oncologically safe NSM approaches has been the next technical challenge.

NIPPLE ANATOMY

Early approaches to NSM were based on the premise that preservation of the blood supply to the nipple required leaving at least 0.5 to 1 cm of breast tissue beneath the nipple and areola [6]. This "subcutaneous mastectomy" technique reliably preserved nipple perfusion but was ultimately deemed oncologically unsafe. Anecdotal reports of local recurrence and development of new cancers in breast tissue retained beneath the nipple areola complex (NAC) [3,7] led to abandonment of this approach.

To help guide development of an oncologically safe NSM procedure our group performed a detailed study of nipple microanatomy. This work identified several previously unrecognized features of nipple anatomy relevant to nipple-sparing surgery [8,9]. Awareness of these features has allowed development of techniques for thorough resection of ducts beneath and within the nipple while preserving nipple perfusion [10,11], described in subsequent sections.

Duct bundle anatomy

The mean number of nipple ducts is 23 with a mean duct bundle diameter of 5 to 5.5 mm centered within the nipple papilla. This diameter is fairly uniform and independent of external nipple diameter [8].

Vessel anatomy

Nipple skin perfusion is predominantly from the skin. Only one-third of vessels to the nipple travel within the duct bundle, whereas two-thirds travel in nipple skin preserved during NSM [9]. Perfusion of the areola is almost exclusively through skin vessels.

Skin flap anatomy

There are no Cooper ligaments under the nipple and areola. The subcutaneous fat layer present under breast skin does not extend under the nipple and areola