Breast cancer is the most common cancer diagnosed in women. Nipple-sparing mastectomy (NSM) offers the opportunity to preserve the breast envelope and the nipple-areolar complex by removing only breast tissue and avoiding multiple surgical procedures for reconstruction. The objective of this article is to review the oncologic and surgical concerns with NSM, along with the appropriate selection of patients and potential postoperative complications. A review of the literature was conducted through MEDILINE®, PubMed, and Google Scholar, focusing on recent research. The findings revealed that although the oncologic safety of NSM continues to be debated, indications are strong that cancer recurrence rates are low and the aesthetic motivation is high for carefully screened patients. From those findings, considerations for patient education regarding risks and expectations are described. Nurses in a variety of cancer care settings can use this information to address the concerns of patients making decisions regarding surgical options and adjusting to postoperative body image expectations and changes.

Breast cancer remains the most frequently diagnosed cancer among women. The American Cancer Society (2012) estimated that 226,870 women would be diagnosed with invasive breast cancer in 2012. Most women with breast cancer will have some form of surgery, which will involve a series of decisions. Surgical decisions may include a choice between lumpectomy, which was formerly considered “breast conserving,” and mastectomy, with or without reconstruction. Evidence exists of a reversal in the previously declining national mastectomy rates, with the frequency of mastectomy declining until 2005 and subsequently rising (Mahmood et al., 2012).

Increasingly, women who choose mastectomy also are choosing breast reconstruction, either at the time of mastectomy or later. In 2011, 96,277 breast reconstruction procedures were conducted, an increase of 3% over 2010 and an increase of 22% since 2000 (American Society of Plastic Surgeons, 2012). Gene testing for BRCA mutations also has contributed to increasing mastectomy rates, which, with acceptance of prophylactic mastectomies, often are performed with immediate reconstruction (Habermann et al., 2010).

In an evolution of the phrase “breast conserving,” skin-sparing mastectomy (SSM), or preservation of the natural skin envelope, was introduced by Toth and Lappert (1991). The technique has enhanced aesthetic outcomes without compromise in oncologic safety (Yi et al., 2011). As SSM has become more widely used, interest has focused on the addition of nipple-sparing procedures to enhance breast conservation with additional aesthetic benefit.

Nipple-sparing mastectomy (NSM) preserves the breast envelope and the nipple-areolar complex (NAC) by removing only breast tissue and avoiding multiple surgical reconstruction procedures. Because cancer rarely originates in the NAC, NSM for prophylactic mastectomy has become widely regarded as safe, but for patients with cancer, acceptance has been slower because of concerns regarding oncologic safety (Spear et al., 2011). In Europe, NSM has been used more widely in the treatment of ductal carcinoma in situ and invasive cancers, but NSM has been adopted more slowly in the United States because of concerns that preserved tissue could be a source of cancer recurrence (Yueh et al., 2009).

The major concerns with NSM can be categorized as oncologic and surgical. The oncologic concerns include the risk of cancer recurrence related to the NAC. Surgical concerns relate to the viability of the NAC because of the possibility of necrosis.
Aesthetics

Preservation of the NAC and its association with a woman’s body image are significant factors in patient preference for NSM (Damen et al., 2011; Murthy & Chamberlain, 2012). According to Spear, Hannan, Willey, and Cociolovo (2009), “The loss of the nipple may be as or more psychologically significant than the loss of the breast mound itself” (p. 1666). Surgeons have developed techniques to create a nipple and areola with inconsistent results, rarely achieving the natural appearance of a native nipple or with the same psychological benefit (Spear et al., 2009).

For women facing mastectomy, research has demonstrated that the possibility of nipple-sparing surgery is helpful to better cope with the traumatic experience of breast cancer and loss of a breast, with patient satisfaction ratings of “very high” in regard to NSM (Didier et al., 2009). More specifically, Nahabedian and Tsangaris (2006) reported patient satisfaction with NSM was rated from good to excellent in 79% (n = 14) of patients. In addition, the possibility of a mastectomy being nipple-sparing may increase the willingness of women to consider risk-reduction mastectomy (Wijayanayagam, Kumar, Foster, & Esserman, 2008). When asked why they chose NSM, women frequently stated they were willing to accept an increased risk of local cancer recurrence to preserve their nipple and areola (Yueh et al., 2009). The majority (80%, n = 10) stated that preserving the NAC symbolized a sense of wholeness where their bodies would feel less mutilated. Women used the terms “psychological calmness,” “wholeness,” and “most natural appearing” when describing their decision-making process (Yueh et al., 2009).

Selection of Patients

Although many women may express a preference for NSM, preoperative screening is essential in identifying appropriate candidates. The primary consideration is oncologic safety, which initially is reviewed based on the size and location of the tumor. General guidelines are that the tumor should be 3 cm or less in size and at least 2 cm away from the center of the nipple (Murthy & Chamberlain, 2012). To further evaluate the breast tissue, preoperative high-resolution magnetic resonance imaging often is recommended to evaluate the breast duct anatomy (Wijayanayagam et al., 2008). In addition, the patient should have negative sentinel nodes, no skin involvement, and no evidence of inflammatory breast cancer (Murthy & Chamberlain, 2012).

Breast size is an additional consideration. Patients with excessively large or ptotic breasts may be more prone to postoperative nipple or areolar necrosis (de Alcantara Filho et al., 2011; Spear et al., 2009). The final decision regarding NSM is made in the operating room after breast tissue at the base of the nipple is removed and sent for biopsy to screen for cancer. If any cancer cells are found on the frozen section, the nipple is removed as part of the mastectomy. The risk of malignancy in the NAC is estimated to be 3%-15%; when this occurs, NSM is aborted (Spear et al., 2009).

With careful screening of patients, the most recently published studies revealed even lower malignancy rates of 3%-5% in the NAC for patients undergoing NSM (Chen et al., 2009; de Alcantara Filho et al., 2011; Wijayanayagam et al., 2008).

The goal of preserving the nipple in mastectomy is to achieve the optimal cosmetic result with little or no sacrifice to oncologic or surgical safety, usually with nipple sensation limited at best. The patient must agree that the cosmetic goal is worth the additional preoperative and intraoperative screening, evaluation, testing, and possible increased oncologic risk, even if it is believed to be small (Spear et al., 2009).

Surgical Procedure

Preserving the nipple or even just the areola allows the possibility that a scar will not need to traverse the front of the breast (Spear et al., 2009). The location and type of incision needed for NSM has been associated with nipple necrosis (Murthy & Chamberlain, 2012). The optimal incisions are either periareolar (with or without a lateral extension), radial, or lateral mammary fold, not traversing more than one-third of the areola diameter in any case (Spear et al., 2009). Garwood et al. (2009) found that incisions extending around more than 30% of the areolar circumference were an independent risk factor for necrosis. The survival of the NAC is highest (97%) with the radial incision (Wijayanayagam et al., 2008).

Oncologic Concerns

Concern persists that a new primary cancer could arise in ductal tissue remaining after NSM; however, accumulating data support that properly screened patients have a local recurrence rate of 3%-6%, which is comparable with recurrence rates in modified radical or skin-sparing mastectomies (Petit et al., 2009; Yueh et al., 2009). One reason for the low recurrence rate is screening for involvement using the frozen section biopsy, as the NAC is an uncommon primary site for breast cancer development (Chen et al., 2009).

An additional concern is cancer recurrence associated from retaining the NAC. Multiple retrospective studies have found that the long-term risk of cancer developing in the nipple and surrounding tissues after NSM is “low but not zero” (Spear et al., 2011, p. 1005) for therapeutic and prophylactic indications, but because the procedure is still relatively new, longer-term data are not yet available (Gerber, Krause, Dieterich, Kundt, & Reimer, 2009; Petit et al., 2009; Spear et al., 2009, 2011).

Postoperative Complications

Postoperative complications related to nipple-sparing surgery usually are related to oxygenation through the breast tissue to the nipple, contributing to tissue necrosis. The aggressive nature of nipple coring to remove ductal tissue and obtain a frozen section involves eversion of the nipple, which can be traumatic to the vasculature. Factors that may influence tissue necrosis include the experience of the surgical team and the type of incision. Patient factors that may negatively impact success include larger breasts, ptotic breast associated with aging, smoking, vascular disease, and diabetes, but these seldom are reported. In some circumstances, partial necrosis may occur to superficial layers of the skin, and complete healing may occur gradually over several weeks.

The reported incidence of necrosis following NAC preservation ranges from 0%-48%, with most reporting less than 10% (Chen et al., 2009; Rusby, Smith, & Gui, 2010). Comparison between studies is difficult because no standard measure of
necrosis extent or severity exists. Nipple and skin flap swelling may occur during the initial postoperative period, but that resolves gradually over three months (Yueh et al., 2009). When some degree of necrosis developed, 93% resolved and the NAC was preserved with localized wound care (Spear et al., 2011). These findings are consistent with reports of “some degree of skin desquamation or necrosis” (20%), where 10% were deemed a surgical complication and only 5% required operative debridement (de Alcantara Filho et al., 2011). The management of a necrotic nipple depends on the extent and severity. Although some surgeons report postoperative debridement rates higher than 17% (Yueh et al., 2009), others advocate that partial or superficial necrosis be managed with topical wound care. In general, conservative management of full-thickness necrosis is regarded as safe practice provided no evidence exists of implant infection (Rusby et al., 2010).

Postoperative Changes to the Nipple-Areolar Complex

Position

Patients need to have realistic expectations regarding postoperative changes to the surviving nipple and areola. Regardless of the type of reconstruction, a corresponding change occurs in the underlying breast mound that impacts the position of the preserved nipple. Some have argued that a preserved malpositioned nipple is worse than a correctly positioned, high-quality nipple reconstruction (Rusby et al., 2010). In some cases, additional plastic surgery procedures may be needed to modify the NAC placement. Depending on whether breast reconstruction involves tissue expanders, an implant, or a flap procedure, additional or extended incisions may be necessary. With postoperative swelling and drain placement, it can be difficult to gauge the aesthetics of the NAC until more healing occurs. When additional revision is needed, it most often is done on an outpatient basis.

Sensation

To date, research has been limited regarding nipple sensation after mastectomy and reconstruction. Sensation may return gradually as swelling to the NAC and breast tissue resolve (Petit et al., 2011). The most optimistic research revealed as many as 79% of women reporting a return of some nipple sensation, but this was limited to light touch and pain (Yueh et al., 2009). Nahabedian and Tsangaris (2006) further described sensation with an altered quality, more like that of surrounding skin. Each of these studies was limited by a lack of clarity on methods of assessment and by qualitative rather than quantitative data. Whether variables such as surgical technique and incision placement play a role in return of sensation is not yet known. Although most authors reported limited sensation, a surprising finding was that some preserved nipples remained potentially erectile (Rusby et al., 2010).

Patient Education

For patients interested in nipple-sparing surgery, preoperative education is important to discuss risks and expectations. Patients increasingly are using the Internet to research surgical options, in some cases requesting multiple referrals in search of a surgeon willing to perform nipple-sparing surgery (Yueh et al., 2009). Preoperatively, breast surgeons must evaluate the oncologic risks in conjunction with the history and physical examination of an individual patient in determining the suitability of NSM, conveying clearly that the final determination occurs in the operating room based on pathology. In most cases, additional discussion would take place with the reconstructive surgeon regarding the planned reconstructive procedure and the option for NAC preservation. Although a single-stage surgery is often a motivation, postoperative factors such as tissue healing and the ultimate size of the breasts can influence the shape and location of the NAC, which may lead to additional surgery for cosmetic enhancement (Yueh et al., 2009).

Patients should be informed about the risk of postoperative NAC necrosis and the possible need for removal, debridement, or topical care. In addition, expectations regarding placement, appearance, sensation, and nipple projection should be described.

Nursing Considerations

Preoperative

Nurses involved in preoperative assessment and teaching are often in a unique position to address patient questions and concerns. Patients may vacillate between prioritizing concerns for oncologic safety with body image issues. Understanding patient expectations preoperatively and stressing that the nipple-sparing aspect of mastectomy cannot be guaranteed are both important. If a partner is involved, a discussion with both may be helpful to address questions and expectations. In addition, potential complications should be described. Patients need to understand that although they may be pleased to know their mastectomy spared the nipple, a successful outcome for the NAC cannot be assured until several days postoperatively.

Postoperative

During the immediate postoperative period, physical assessment of the breast and NAC is focused on circulation and infection prevention. For patients undergoing flap procedures, Doppler or ViOptix Tissue Oximetry can detect decreased blood flow before skin color changes occur (Keller, 2007). Any decrease in blood flow could lead to loss of a free flap, which also would impact the NAC—devastating to both the patient and the surgeon—so notifying the surgeon immediately of signs of decreased perfusion is essential (Stermer, 2010). Salvage rates for anastomotic thrombosis are 50% and directly related to the amount of time that elapses from the event to the correction; therefore, vigilance and timeliness are paramount. In addition
Implications for Practice

- Although many women express a preference for nipple-sparing mastectomy (NSM), oncologic safety is the most important factor, and a final determination of whether NSM can safely proceed is made in the operating room.
- The most common postoperative complication following NSM is tissue necrosis of the nipple-areolar complex, which requires careful assessment and the possible need for debridement or topical care.
- Patients who undergo mastectomy with reconstruction and NSM will be discharged with Jackson Pratt drains in place. In addition to patient teaching during the postoperative period, patients should be referred for homecare follow-up.

Conclusions

The oncologic safety of NSM continues to be debated. Most published research is limited by insufficient long-term follow-up, but strong indications exist that, for carefully screened patients, cancer recurrence rates are low and the aesthetic motivation is high. As patients become more aware of nipple-sparing options, interest in this surgery will no doubt increase; however, this surgical approach is not appropriate for all women. As the prevalence of NSM increases, research on outcomes is needed; additional considerations regarding selection criteria will continue to evolve. For women undergoing mastectomy, nipple-sparing surgery has been shown to have a positive impact on patient satisfaction and body image, but patients should be counseled on potential complications and realistic outcome expectations.

References


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