

Staged Breast Operations: The Nipple Delay as an Old and New Idea

Every surgical procedure is dependent on adequate vascular perfusion of the associated surgical tissues to ensure a complication free outcome. From the colorectal anastomosis deep in the pelvis to the complex solid organ and extremity transplants, an adequate blood supply is necessary for survival of each surgical and skin closure. In this edition of *Annals of Surgery*, Drs Dabek, McUmbler, and Driscoll from the Massachusetts General Hospital describe the nipple delay surgery as a procedure to enhance vascular perfusion and recruit additional blood supply to the nipple/areolar complex, thereby reducing the risk of nipple and/or areolar necrosis after a subsequent nipple and skin-sparing mastectomy (NSM). The authors have brought to the forefront a surgical procedure, which has been in existence for many years, but should perhaps be more frequently considered in the armamentarium of breast and reconstructive surgeons due to the increasing utilization of nipple sparing mastectomy. Summarized are the retrospective reports evaluating the nipple delay procedure and described are the favorable outcomes from their institutional experience. The nipple delay procedure itself is not extensively described in this report, but involves an outpatient procedure which cuts or separates the nipple areolar complex from the underlying breast tissue utilizing, either a planned mastectomy or separate peri-areolar incision. The length of separation outside the areola varies in the descriptive reports, as does the time to subsequent surgery, but, in general, vary between 2 and 5 cm and 2 to 5 weeks, respectively. Discussed is the ability to add a biopsy of the posterior nipple tissue to ensure that there is no malignant or pre-malignant changes in the area and thereby enable nipple removal at the time of mastectomy if cancer is present.

Staged operations for breast surgery are not a new idea, but have been used for over 25 years to assist in improved reconstructive outcomes, and also define the best oncologic options for breast cancer patients.

The use of a separate delay procedure to enhance the blood supply to tissue was not infrequently used when the transverse rectus abdominus myocutaneous (TRAM) flap was the primary form of autologous breast reconstruction.¹ As the deep inferior epigastric perforator (DIEP) flaps and microvascular techniques have become more popular, this procedure is now less commonly utilized, but remains an important technique to re-introduce in select patients who desire autologous reconstruction, but may not be good candidates due to associated comorbidities. In addition to staged procedures to improve breast reconstruction outcomes, a separate sentinel node surgery is sometimes recommended to define the patients' extent of disease and need for radiation before an immediate reconstruction. In this scenario, if the patient was to undergo a nipple delay, the sentinel node surgery could be added to this procedure to determine the need for postmastectomy radiation therapy.

Important in evaluating any additional surgical procedure for breast patients interested in a mastectomy and reconstruction are patient selection, cost-effectiveness, and also impact on long-term survival. Recent reports have described risks of any skin necrosis and severe necrosis after NSM and reconstruction between 14% to 26% and 5 to 10%, respectively.^{2,3} Each of these well-designed prospective studies of patient outcomes have highlighted the increased risks of necrosis and complications in select patient populations. Patients with higher BMI and greater breast size leading to increased operative time, and also those with prior smoking history or radiation therapy are at greater risk for complications. Interestingly, in the study by Matsen et al, just performing a NSM had the largest impact on postsurgical complications. The cost-effectiveness of increasingly adding surgical procedures for breast reconstruction and/or oncologic surgery have not previously been extensively evaluated, but recent literature is starting to highlight the importance of this concept, and future studies will likely be needed to validate the cost-benefit ratio of additional procedures such as that of nipple delay.⁴ Finally, in considering the addition of a surgical procedure and potential delay of a primary cancer removal, the impact on patient survival needs

to be considered. Large database analyses have shown that delays of greater than 120 days to surgery, and greater than 90 days from surgery to chemotherapy may lead to decreased patient survival.^{5,6} As surgeries such as the nipple delay are considered the impact of these additional interventions need to be factored into the care plan of the patient to ensure a compromise in long-term survival is not introduced. In summary, the nipple delay for reduced nipple areolar complex complications in NSM is an old and new idea which would benefit from standardization of procedure and patient selection. As the breast surgical community moves forward with providing personalized approaches to our cancer and high-risk patients the onus is on us to ensure that we identify and study in a systematic manner, the patient populations that benefit from additional procedures such as a nipple delay and those that should not due to unnecessary cost burden versus delays in oncologic treatments.

Lee Gravatt Wilke, MD, FACS

Professor of Surgery
University of Wisconsin
Madison, WI.
wilke@surgery.wisc.edu

REFERENCES

- Restifo RJ, Ward BA, Scoutt LM, et al. Timing, magnitude, and utility of surgical delay in the TRAM flap: II. Clinical studies. *Plast Reconstr Surg.* 1997;99:1217–1223.
- Matsen CB, Mehrara B, Eaton A, et al. Skin flap necrosis after mastectomy with reconstruction: a prospective study. *Ann Surg Oncol.* 2016;23:257–264.
- Odom EB, Parikh RP, Um R, et al. Nipple-sparing mastectomy incisions for cancer extirpation prospective cohort trial: perfusion, complications, and patient outcomes. *Plast Reconstr Surg.* 2018;142:13–26.
- Shekter CC, Matros E, Momeni A. Assessing value in breast reconstruction: a systematic review of cost-effectiveness studies. *J Plast Reconstr Aesthet Surg.* 2018;71:353–365.
- Jabo B, Lin AC, Aljehani MA, et al. Impact of breast reconstruction on time to definitive surgical treatment, adjuvant therapy, and breast cancer outcomes. *Ann Surg Oncol* 2018 [Epub ahead of print].
- Riba LA, Bruner RA, Fleishman A, et al. Surgical risk factors for the delayed initiation of adjuvant chemotherapy in breast cancer. *Ann Surg Oncol.* 2018;25:1904–1911.