

Postmastectomy Breast Reconstruction in the Time of the Novel Coronavirus Disease 2019 (COVID-19) Pandemic

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Background: Breast reconstruction has a well-documented positive impact on the psychosocial well-being of women recovering from breast cancer. Rates of breast cancer diagnoses are rising, and more women are seeking mastectomy as treatment and as prophylaxis.

Methods: Postmastectomy breast reconstruction often begins at the time of mastectomy in coordination with the oncologic breast surgeons. Immediate breast reconstruction increases complication rate (11% vs 4%) and unplanned reoperation rate (7% vs 4%), requiring more personnel and resources used during the preoperative, intraoperative, and postoperative phases of patient care.

Discussion: In the setting of global pandemics such as coronavirus disease 2019 (COVID-19), breast reconstruction demands a unique and nuanced approach, as most forms of breast reconstruction can occur successfully in a delayed fashion. While this may prolong the overall time until completion of reconstruction, other factors come into play in the setting of a communicable (potentially deadly) illness. Factors that must be considered include allocation of essential resources and protection of patients and families from disease transmission.

Conclusions: Plastic surgeons performing breast reconstruction must take these factors into account when counseling their patients, colleagues, and institutions and be proactive in determining which procedures are time-critical and which should be postponed until the disaster situation has relieved. (*Plast Reconstr Surg Glob Open* 2020;8:e2967; doi: [10.1097/GOX.0000000000002967](https://doi.org/10.1097/GOX.0000000000002967); Published online 9 June 2020.)

INTRODUCTION

The novel coronavirus disease 2019 (COVID-19) has quickly become a global pandemic. The American College of Surgeons and the American Society of Plastic Surgeons, in accordance with the Centers for Disease Control guidelines, recommended postponing or canceling elective surgeries.^{1,2} The purpose of this recommendation is 2-fold: (1) reducing patient and visitor traffic in healthcare settings to diminish transmission between patients and healthcare staff and (2) preserving vital resources, including hospital beds, critical care and ventilator supplies, and personal protective equipment critical for the protection of patients and healthcare

professionals. Many organizations and societies, including the American College of Surgeons, American Society of Plastic Surgeons, Centers for Disease Control, the Centers for Medicare and Medicaid Services, and the Society of Surgical Oncology, have released position statements indicating that breast reconstruction procedures may be considered elective if none of the following criteria are met:

- threat to the patient's life if surgery is not performed;
- threat of permanent dysfunction of an extremity or organ system;
- risk of metastasis or progression of disease; and
- risk of rapidly worsening to severe symptoms (time sensitivity).¹⁻⁵

Conserving limited resources and preventing disease spread have prompted many healthcare professionals to carefully consider which procedures should be considered time-critical and which may be delayed.

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BREAST RECONSTRUCTION

Invasive breast cancer will develop in approximately 12% of women in the United States during their lifetime. Mastectomy remains a common method of surgically treating breast cancer. With increasing understanding of the genetic risk of breast cancer, the rate of prophylactic mastectomy continues to increase in certain high-risk populations.⁶ Following mastectomy, women often experience challenges related to body image, psychosocial well-being, and quality of life (QOL).⁷ Psychosocial and health-related QOL benefits of postmastectomy breast reconstruction have been well documented for many years, leading to the Women's Health and Cancer Rights Act enacted in 1998 mandating health insurance coverage for breast reconstruction. Over the last 20 years, the rate of breast reconstruction in women undergoing mastectomy has steadily increased.⁶ The majority of women (70%) undergoing mastectomy and breast reconstruction will opt for immediate breast reconstruction (IBR) at the time of mastectomy.⁸ For medical reasons or personal choice, some women will choose delayed breast reconstruction (DBR). Although IBR may have some early benefit, on average, patient-reported outcomes (PRO) of both IBR and DBR are comparable.⁸ Lack of a critical difference in the outcomes between IBR and DBR begs the question whether breast reconstruction meets the criteria above to be considered nonelective.

SURGICAL PROCEDURES

The process of postmastectomy breast reconstruction generally falls under 2 categories: prosthetic and autologous. Although a single-stage reconstruction may be possible in select cases, most reconstructions will require 2 or more stages. For prosthetic reconstruction, a tissue expander (TE) is often placed at the time of mastectomy to be exchanged at a later date for a permanent prosthesis. In autologous breast reconstruction, a flap (ie, transverse rectus abdominis myocutaneous flap or deep inferior epigastric artery perforator flap) is placed at the time of the mastectomy. In both approaches, there will often be revision surgeries at later time points. Traditionally, this process begins in conjunction with the mastectomy to combine the first stage and shorten the time to ultimate reconstruction.

COVID-19 TRANSMISSION

The process of breast reconstruction obligates an increased number of contact points potentiating the spread of the virus. Preoperatively, the patients must meet not only the breast oncology teams but also the plastic and reconstructive surgery team. This often includes receptionists, medical assistants, nurses, and physicians. During surgery, there must be a second operating room (OR) team for the reconstruction in addition to the primary oncologic resection team. Postoperatively, there would be follow-up visits including weekly visits for expansions in the case of prosthetic-based reconstruction. In addition, if reconstruction continues at a normal pace, there would also be other patients and visitors unnecessarily in the

waiting rooms. Each of these contact points creates potential vectors for transmission of COVID-19 to the patients and staff.

ALLOCATION OF RESOURCES

Availability of resources during the COVID-19 pandemic is alarmingly low, including hospital staff, operating room and anesthesia equipment, and most critically personal protective equipment. Performing combined oncologic and reconstructive procedures requires excess resources between the oncologic and reconstructive teams. These include operating time (which stresses anesthesiologist and ventilator availability) and additional equipment and personnel, as there must be a dedicated team and setup for the oncologic portion distinct from the reconstructive portion. In the postoperative setting, additional equipment and resources must be used for standard precautions with patient evaluations and serial tissue expansions.

COMPLICATIONS

Although breast reconstruction has been proven to improve QOL and PRO metrics, it is not without issue. There is an increased complication rate in mastectomy with IBR (11%) when compared with mastectomy alone (4%).^{9,10} Complications in the setting of breast reconstruction may often require an unplanned return to the OR for issues such as implant exposure or concern for flap ischemia. A recent study using National Surgical Quality Improvement Program (NSQIP) data from 2015 revealed a 4% unplanned reoperation rate in mastectomy versus 7% in mastectomy with IBR.¹⁰ And, in the context of neoadjuvant and adjuvant treatments, this number increases to >17%.¹¹ When comparing various forms of breast reconstruction in the immediate or delayed setting, a multicenter study showed an unplanned reoperation rate of 19.3% and a wound infection rate of 9.8%.¹² Some may argue the benefits of IBR in improved aesthetic appearance and in combining an operation when compared with the DBR, and the short time to place a TE as a bridge for final reconstruction requires minimal time or resources.¹³ But, in addition to the required resources previously discussed, a complication with the TE requires hospitalization and often a return to the OR for explantation, placing strain on an already stressed healthcare system with limited resources, and adds potentially dangerous contact points during a time when isolation is critical to limiting spread of COVID-19.

Some patients may require immediate reconstruction when delayed reconstruction carries significantly higher complication rates such as oncoplastic breast reconstruction or rapid tissue expansion and exchange before radiation therapy.^{14,15} These situations must be evaluated on a case-by-case basis with risk:benefit analysis discussed in detail with the patient.

CONCLUSIONS

Primum non nocere—first, do no harm. This foundational principle of biomedical ethics must permeate every activity in which we as healthcare professionals engage. Breast reconstruction is important. The landscape of breast cancer and women's health has been revolutionized by our ability to restore what this cancer has taken. But, we as healthcare professionals must consider the ramifications of our actions as they impact multiple levels in healthcare systems. Breast reconstruction can safely and effectively be performed in delayed fashion with arguably equal QOL and PRO metrics.⁸ Delaying elective procedures is imperative in the setting of a global pandemic such as COVID-19 until such a time as it is safe and reasonable to resume business as usual—determinants which will depend to a great extent on improved precision and reliability of real-time epidemiological modeling, serologic testing, rapid COVID-19 screening, and evidence-based approaches to risk assessment. Healthcare professionals must work proactively to limit disease transmission and decrease utilization of vital resources by critically assessing those procedures, such as postmastectomy breast reconstruction, that may be delayed, thus preserving these resources for the more time-critical needs.

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