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Breast

An Argument for the Safety of Immediate Device Reconstruction following Mastectomy during the COVID-19 Crisis

Hao Huang, BS*
Rose H. Fu, MD†
Emma Vartanian, MD‡
Jerry Y. Du, MD§
David M. Otterburn, MD*

Background: Although oncologic surgery is deemed urgent during the COVID-19 pandemic, clinical guidelines in reconstructive surgery have been unclear. Utilizing propensity-matched pre-pandemic data and our institutional experience during the crisis, we aimed to assess the safety of immediate device reconstruction following mastectomy to aid in decision-making during the pandemic.

Methods: Women undergoing mastectomy only and mastectomy with immediate breast reconstruction (IBR) with tissue expander or permanent implant from the 2007–2013 ACS-NSQIP datasets were included. Multivariate analysis of independent variables was used to form propensity-matched cohorts. Incidence of 30-day major postoperative bleeding and hospital length of stay were compared.

Results: In total, 13,580 mastectomy only patients and 11,636 IBR patients were identified. Factors that were found to be associated with IBR included age ($P = 0.022$), BMI ($P < 0.001$), race ($P = 0.010$), diabetes ($P = 0.007$), chronic steroid use ($P = 0.003$), pulmonary disease ($P = 0.004$), cardiovascular disease ($P < 0.001$), disseminated cancer ($P = 0.001$), chemotherapy before surgery ($P = 0.016$), low hematocrit ($P < 0.001$), and total operative time ($P < 0.001$). After propensity matching, immediate device reconstruction following mastectomy was not found to be associated with greater risk of postoperative bleeding (1.4% versus 1.0%, $P = 0.334$) or increased length of stay (1.5 ± 2.9 versus 1.5 ± 3.5 days, $P = 0.576$).

Conclusions: Immediate device reconstruction does not elevate morbidity in terms of postoperative bleeding or does not increase the length of hospital exposure. Tissue expander or implant reconstruction can be safely performed immediately following mastectomy during the COVID-19 pandemic. Further, our institutional experience during the pandemic indicates that select patients can continue to safely undergo ambulatory mastectomy with device placement. *(Plast Reconstr Surg Glob Open 2021;9:e3627; doi: 10.1097/GOX.0000000000003627; Published online 21 May 2021.)*

INTRODUCTION

Breast reconstruction following mastectomy is increasingly seen as an essential component of breast cancer treatment, as it has been shown to improve psychosocial well-being and even confer additional survival advantage.[1]

*From the *NewYork-Presbyterian, Weill Cornell Medical Center, New York, N.Y.; †Oakland Medical Center, Oakland, Calif.; ‡Keck School of Medicine of University of Southern California, Los Angeles, Calif.; and §University Hospitals Cleveland Medical Center, Case Western Reserve University, Cleveland, Ohio.*

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Despite the proven benefits, breast reconstruction carries its own unique set of challenges that may predispose to postoperative morbidity, with one of the most dreaded acute complications being major bleeding.

The implications of postoperative morbidity following breast reconstructive surgery are heightened during the current coronavirus disease 2019 (COVID-19) crisis, as it can contribute to increased length of stay (LOS) and increased rates of readmission and reoperation. Longer hospitalizations predispose patients and staff to potential hospital-acquired coronavirus infection, especially in areas of significant community spread and asymptomatic infections.[2] Readmissions and reoperations incur the use of precious resources, including personal protective equipment (PPE), ventilators, and hospital beds, that are necessary for the care of COVID+ patients. Therefore, it is critical to

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characterize how these parameters change with the addition of breast reconstruction at the time of mastectomy.

Furthermore, official guidelines in breast reconstruction have been unclear and even conflicting during the pandemic. While recommendations regarding urgent procedures such as oncologic surgery are straightforward, guidance with reconstructive surgery has been less clear.[3–5] The Center for Medicare and Medicaid Service recommendations, published on March 15, 2020, deemed oncologic surgery such as mastectomy to be high-acuity and necessary during the pandemic, while offering no clear guidance on reconstruction.[3] United States state governments have likewise provided minimal clarity, with only 12 states offering specific guidelines on malignancy-related elective procedures.[6] The American Society of Plastic Surgeons released the most nuanced guidance to date, suggesting that delayed and revision breast reconstruction should be postponed until elective surgery is deemed safe in the area of practice. IBR, on the other hand, can be considered on a case-by-case basis.[7] However, their recommendations are only to be contradicted by Ozturk et al, who suggested that plastic surgeons should consider postponing all cases of posmastectomy breast reconstruction.[8]

Without clear guidelines amid the COVID-19 pandemic, it is imperative to lean on empirical evidence and evaluate the implications of IBR through the lens of hospital exposure and resource utilization to assess its safety and help inform best practices. This objective can be fulfilled by analyzing hospital LOS and postoperative morbidity such as major bleeding, an established contributor of increased LOS and unplanned readmissions.[9–13] Presently there are also no studies that examine the impact of immediate device reconstruction on postoperative bleeding compared with mastectomy alone. Pre-pandemic data are deliberately chosen for this study to have large-scale data and robust propensity-matched analysis. The aim of this study was to assess the added LOS and bleeding risk associated with immediate device reconstruction, thereby evaluating whether this intervention is a safe adjunct for women who are undergoing mastectomy during the ongoing pandemic. We then supplement the findings with our institutional experience at a large tertiary and quaternary care center, which experienced an early COVID-19 surge in the spring and early summer of 2020.

METHODS

Patient Selection and Outcome Variables

Nationally validated datasets from the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) from 2007 to 2013 were accessed. Older datasets were chosen for this study to focus our analysis on the subpectoral approach, which was considered the most conventional technique before the rising popularity of the prepectoral approach. For each surgical encounter, the ACS-NSQIP records patient demographics, comorbidities, laboratory values, procedures performed, anesthesia details, perioperative details, and 30-day postoperative complications.

Current procedural terminology codes were used to identify patients who underwent mastectomy only (MO) and those with immediate device reconstruction (Table 1). Patients with current procedural terminology codes for partial mastectomy (19301, 19302), delayed implant placement (19342), and flap reconstruction (19361, 19364, 19366, 19367, 19368, 19369) were excluded. Only female patients were included in this study.

Major postoperative bleeding was noted if it occurred within 30 days of surgery and required transfusion of at least 1 unit of packed or whole red blood cells,[14] and it was treated as a dichotomous variable (no transfusion versus 1 or more transfusions). Hospital LOS, which was used as surrogate for degree of hospital exposure, was recorded.

Independent Variables

Demographic variables, comorbidities, preoperative laboratory values, and perioperative details were examined. Variables are defined per the ACS-NSQIP user guide.[14] World Health Organization guidelines were used to stratify obesity classes, including non-obese (BMI < 30 kg/m^2), class I obesity (BMI = 30–34.9 kg/m^2), class II obesity (BMI = 35–39.9 kg/m^2), and class III obesity (BMI ≥ 40 kg/m^2).

Pulmonary, cardiovascular, and renal comorbidities were analyzed by system as an aggregate of individual diseases, and they were treated as dichotomous variables (no disease versus 1 or more diseases). Pulmonary diseases included chronic dyspnea and chronic obstructive pulmonary disease. Cardiovascular diseases included congestive heart failure, angina, hypertension, peripheral vascular disease, ischemic vaso-occlusive disease/gangrene, and previous cardiac surgery. Renal diseases included acute preoperative renal failure and dialysis. Disseminated cancer was defined as either metastatic or locally invasive cancer. Chemotherapy was noted if patients received any nonhormonal chemotherapy treatment within 30 days before surgery. Radiotherapy was noted if any radiation treatment was administered within 90 days before surgery. Sepsis was defined using the SIRS criteria.[15]

Laboratory values were assessed based on normal values. Elevated white blood cell count was defined as

Table 1. CPT Codes Used to Identify Women Who Underwent MO and Those with Immediate Device Reconstruction following Mastectomy

Mastectomy codes	
19303	MASTECTOMY SIMPLE COMPLETE
19304	MASTECTOMY SUBCUTANEOUS
19305	MAST RAD W/PECTORAL MUSCLES AXILLARY LYMPH NODES
19306	MAST RAD W/PECTORAL MUSC AX INT MAM LYMPH NODES
19307	MAST MODF RAD W/AX LYMPH NOD W/WO PECT/ALIS MIN
Device reconstruction codes	
19340	IMMT INSJ BRST PROSTH FLWG MASTOPEXY MAST/RCNSTJ
19357	BRST RCNSTJ IMMT/DLYD W/TISS EXPANDER SBSQ XPNSJ

>10,000 cells/mcL. Low hematocrit was defined as <37%. Low platelet count was defined as <150,000 platelets/mcL. Perioperative details (including degree of wound contamination and total operative time) were recorded.

Propensity Matching

Adjustment for confounders was performed using propensity matching, as the decision to pursue mastectomy with or without reconstruction is a non-randomized process.[16,17] A propensity score for device reconstruction was calculated by assessing independent variables associated with reconstruction in a multivariate logistic regression model. A propensity score of 0 represented the lowest probability of device reconstruction after mastectomy, whereas a score of 1 indicated the highest probability of reconstruction. Matched cohorts were created utilizing a nearest neighbor matching method, with the caliper set to 0.005.

Statistical Analysis

Continuous variables are presented as mean ± SD, while categorical variables are presented as frequencies (rates). Univariate analysis was performed using Student's *t*-test and chi-squared test for continuous and categorical variables, respectively. Variables that were found to be significant were included in a logistic regression model. Adjusted odds ratios (aOR) and 95% confidence intervals (CI) were calculated for all variables in the final model.

Statistical analyses were performed using SPSS 20.0.0 (IBM, Armonk, N.Y.) except for propensity matching, which was performed using STATA IC 11.0 (StataCorp, College Station, Tex.). All tests were 2-sided, and values of $P < 0.05$ were deemed statistically significant.

RESULTS

An estimated 13,580 cases of MO and 11,636 cases of mastectomy with immediate breast reconstruction (IBR) with tissue expander or permanent implant were identified.

Univariate analysis of the unmatched cohorts is presented in Table 2. Compared with patients with MO, IBR patients were significantly older ($P < 0.001$), had lower BMI ($P < 0.001$), and were more likely to be White ($P < 0.001$). In terms of comorbidities, the unmatched MO cohort had higher rates of diabetes (16.1% versus 4.7%, $P < 0.001$), chronic steroid use (3.4% versus 1.8%, $P < 0.001$), and smoking (13.0% versus 11.3%, $P < 0.001$). The MO cohort was also more comorbid in terms of pulmonary disease (9.6% versus 2.6%, $P < 0.001$), cardiovascular disease

Table 2. Univariate Analysis of Independent Variables between Unmatched Cohorts

		Mastectomy Only (n = 13,580)	Mastectomy with Immediate Device Reconstruction (n = 11,636)	*P*
Demographics				
Age (y)		62.3 ± 12.8	63.4 ± 10.8	<0.001
BMI (kg/m²)		29.2 ± 7.9	26.8 ± 6.5	<0.001
Obesity	Non-obese	8219 (60.7%)	8671 (74.7%)	<0.001
	Class I	2700 (19.9%)	1707 (14.7%)	
	Class II	1455 (10.7%)	802 (6.9%)	
	Class III	1162 (8.6%)	427 (3.7%	
Race	White	9299 (68.5%)	9141 (78.6%)	<0.001
	Black	1618 (11.9%)	796 (6.8%)	
	Other	2663 (19.6%)	1699 (14.6%)	
Comorbidities				
Diabetes		2189 (16.1%)	551 (4.7%)	<0.001
Chronic steroid use		457 (3.4%)	210 (1.8%)	<0.001
Smoker		1769 (13.0%)	1317 (11.3%)	<0.001
Pack-years		5.8 ± 14.8	3.6 ± 10.2	<0.001
Alcohol use		23 (1.0%)	17 (1.2%)	0.538
Pulmonary disease		1304 (9.6%)	302 (2.6%)	<0.001
Cardiovascular disease		6780 (49.9%)	2653 (22.8%)	<0.001
Renal disease		73 (0.5%)	4 (0.0%)	<0.001
Disseminated cancer		397 (2.9%)	112 (1.0%)	<0.001
Bleeding disorders		306 (2.3%)	59 (0.5%)	<0.001
Chemotherapy before surgery		360 (15.5%)	152 (10.7%)	<0.001
Radiotherapy before surgery		25 (1.1%)	7 (0.5%)	0.062
Systemic sepsis		39 (0.3%)	9 (0.1%)	<0.001
Preoperative Labs				
White blood cell count (cells/mcL)		7.0 ± 2.6	6.6 ± 2.3	<0.001
Elevated white blood cell count		724 (6.3%)	384 (4.2%)	<0.001
Hematocrit (%)		38.6 ± 4.3	39.1 ± 3.6	<0.001
Low hematocrit		3214 (27.2%)	1905 (20.3%)	<0.001
Platelet count (platelets/mcL)		250.4 ± 71.8	254.3 ± 64.7	<0.001
Low platelet count		581 (5.1%)	258 (2.9%)	<0.001
Perioperative Details				
Wound classification	1. Clean	13243 (97.5%)	11420 (98.1%)	<0.001
	2. Clean/contaminated	218 (1.6%)	184 (1.6%)	
	3. Contaminated	75 (0.6%)	19 (0.2%)	
	4. Dirty	44 (0.3%)	13 (0.1%)	
Total operative time (minutes)		119.6 ± 72.5	197.8 ± 89.3	<0.001

(49.9% versus 22.8%, $P < 0.001$), renal disease (0.5% versus 0.0%, $P < 0.001$), disseminated cancer (2.9% versus 1.0%, $P < 0.001$), and bleeding disorders (2.3% versus 0.5%, $P < 0.001$). Patients with MO had higher incidences of chemotherapy before surgery (15.5% versus 10.7%, $P < 0.001$) and sepsis (0.3% versus 0.1%, $P < 0.001$). In terms of preoperative labs, MO patients had higher rates of elevated white blood cell count (6.3% versus 4.2%, $P < 0.001$), low hematocrit (27.2% versus 20.3%, $P < 0.001$), and low platelet count (5.1% versus 2.9%, $P < 0.001$).

Unadjusted univariate analysis revealed a higher rate of postoperative bleeding in patients who had MO (1.7% versus 0.7%, $P < 0.001$). Immediate reconstruction had a relative risk of 0.816 (95% CI 0.779-0.855) for postoperative bleeding. Hospital LOS after surgery was comparable between the two groups (MO, 1.5 ± 5.1 days; IBR, 1.5 ± 4.2 days; $P = 0.715$).

Multivariate logistic regression identified factors associated with immediate device reconstruction: age (aOR = 1.013, $P = 0.022$), BMI (aOR = 0.958, $P < 0.001$), race (aOR = 1.013, $P = 0.010$), diabetes (aOR = 0.598, $P = 0.007$), chronic steroid use (aOR = 0.272, $P = 0.003$), pulmonary disease (aOR = 0.514, $P = 0.004$), cardiovascular disease (aOR = 0.561, $P < 0.001$), disseminated cancer (aOR = 0.137, $P = 0.001$), chemotherapy before surgery (aOR = 0.696, $P = 0.016$), low hematocrit (aOR = 0.621, $P < 0.001$), and total operative time (aOR = 1.014, $P < 0.001$) (Table 3). Propensity matching yielded a total of 3136 patients, 2017 of whom had MO and 1119 had device reconstruction immediately following mastectomy.

Univariate analysis of the propensity-matched cohorts is presented in Table 4. Compared with patients with MO, IBR patients remained significantly older ($P < 0.001$), had lower BMI ($P = 0.003$), and were more likely to be White ($P < 0.027$). The matched MO cohort had higher rates of diabetes (11.9% versus 8.9%, $P = 0.011$), chronic steroid use (2.7% versus 1.2%, $P = 0.004$), and cardiovascular disease (42.7% versus 34.9%, $P < 0.001$). Preoperative laboratories revealed that MO patients had higher rates of elevated white blood cell count (5.2% versus 3.3%, $P = 0.028$) and low hematocrit (27.0% versus 21.9%, $P = 0.004$).

After propensity matching, the rate of postoperative bleeding was higher in patients who underwent immediate device reconstruction (1.4% versus 1.0%), but the difference was not significant ($P = 0.334$) with relative risk of 1.135 (95% CI 0.856–1.505). A post hoc analysis revealed power greater than 99.9%. Hospital LOS was comparable between the two matched groups (MO, 1.5 ± 3.5 days; IBR, 1.5 ± 2.9 days; $P = 0.576$).

DISCUSSION

The aim of this study was to determine whether device reconstruction—with tissue expander or direct-to-implant placement—is a safe adjunct for women who are undergoing mastectomy during the COVID-19 pandemic by evaluating hospital LOS and postoperative morbidity. Our analysis reveals that compared with patients with MO, patients who undergo device reconstruction immediately following mastectomy do not experience greater morbidity in terms of major postoperative bleeding and hospital exposure.

Given significant differences in the overall health status of MO patients and those who undergo immediate reconstruction, propensity matching was necessary for any meaningful conclusions to be drawn, warranting the use of large-scale pre-pandemic data in this study. Further, the 2007–2013 ACS-NSQIP datasets were deliberately chosen to focus our analysis on the subpectoral approach and minimize confounders. The prepectoral approach, which does not involve dissection of the pectoralis muscle, was popularized in 2014 by the advent of fat grafting and acellular dermal matrix and early promising studies such as the one published by Berna et al.[18,19] Since the subpectoral method is much more surgically involved and has been shown to be associated with more major postoperative complications,[20] hospital LOS and morbidity from the analysis of subpectoral reconstruction can be inferred to be greater than or equal to that of device reconstruction today.

In our analysis, immediate device reconstruction is not associated with increased risk of major postoperative bleeding compared with mastectomy alone. As bleeding is one of the most serious postoperative morbidities that leads to increased LOS and unplanned readmissions[9–13]; this finding provides reassuring evidence that concomitant device reconstruction can be safely performed during the pandemic. Interestingly, this outcome contrasts with Fischer et al's analysis of ACS-NSQIP datasets, as they noted a significantly higher transfusion rate in patients who underwent MO.[21] In their analysis, the reconstructive modality examined was limited to only tissue expander, whereas the present study includes direct-to-implant reconstruction, which has become more popular as a reconstructive option with the introduction of ADM.[22] As such, our

Table 3. Multivariate Logistic Regression Analysis of Factors Associated with Immediate Device Reconstruction

	Adjusted Odds Ratio	95% Confidence Interval	*P*
Age	1.013	1.002–1.025	0.022
BMI	0.958	0.944–0.972	<0.001
White race	1.013	1.004–1.020	0.010
Diabetes	0.598	0.411–0.871	0.007
Chronic steroid use	0.272	0.114–0.648	0.003
Pulmonary disease	0.514	0.328–0.805	0.004
Cardiovascular disease	0.561	0.454–0.693	<0.001
Disseminated cancer	0.137	0.042–0.448	0.001
Chemotherapy before surgery	0.696	0.519–0.934	0.016
Low hematocrit	0.621	0.484–0.797	<0.001
Total operative time	1.014	1.012–1.015	<0.001

Table 4. Univariate Analysis of Independent Variables between Propensity-matched Cohorts

		Mastectomy Only (n = 2017)	Mastectomy with Immediate Device Reconstruction (n = 1119)	*P*
Demographics				
Age (y)		62.5 ± 12.3	63.6 ± 5.6	<0.001
BMI (kg/m^2)		28.7 ± 8.0	27.9 ± 6.9	0.003
Obesity	Non-obese	12982 (63.7%)	769 (68.7%)	0.019
	Class I	379 (18.8%)	183 (16.4%)	
	Class II	194 (9.6%)	103 (9.2%)	
	Class III	158 (7.8%)	64 (5.7%)	
Race	White	1310 (64.9%)	777 (69.4%)	0.027
	Black	223 (11.1%)	99 (8.8%)	
	Other	484 (24.0%)	243 (21.7%)	
Comorbidities				
Diabetes		240 (11.9%)	100 (8.9%)	0.011
Chronic steroid use		55 (2.7%)	13 (1.2%)	0.004
Smoker		245 (12.1%)	140 (12.5%)	0.766
Pack-years		5.4 ± 14.5	4.5 ± 11.3	0.100
Alcohol use		21 (1.2%)	11 (1.1%)	0.896
Pulmonary disease		147 (7.3%)	67 (6.0%)	0.166
Cardiovascular disease		862 (42.7%)	391 (34.9%)	<0.001
Renal disease		7 (0.3%)	4 (0.4%)	>0.999
Disseminated cancer		44 (2.2%)	15 (1.3%)	0.097
Bleeding disorders		32 (1.6%)	11 (1.0%)	0.164
Chemotherapy before surgery		258 (14.8%)	118 (12.3%)	0.074
Radiotherapy before surgery		20 (1.1%)	5 (0.5%)	0.141
Systemic sepsis		3 (0.1%)	1 (0.1%)	>0.999
Preoperative laboratories				
White blood cell count (cells/mcL)		6.8 ± 2.4	6.6 ± 2.2	0.087
Elevated white blood cell count		90 (5.2%)	32 (3.3%)	0.028
Hematocrit (%)		38.5 ± 4.3	38.9 ± 3.7	0.006
Low hematocrit		481 (27.0%)	212 (21.9%)	0.004
Platelet count (platelets/mcL)		251.8 ± 73.2	253.8 ± 66.0	0.479
Low platelet count		78 (4.5%)	36 (3.8%)	0.372
Perioperative details				
Wound Classification	1. Clean	1973 (97.8%)	1087 (97.1%)	0.541
	2. Clean/contaminated	33 (1.6%)	23 (2.1%)	
	3. Contaminated	9 (0.4%)	6 (0.5%)	
	4. Dirty	2 (0.1%)	3 (0.3%)	
Total operative time (min)		144.5 ± 89.5	171.6 ± 93.9	<0.001

findings suggest that direct-to-implant reconstruction may increase postoperative bleeding risk, though further investigation is warranted. A possible explanation stems from the fact that permanent implants require coverage with a greater surface area of skin, leaving more vessels vulnerable to damage.

A direct examination of hospital LOS also shows that it does not increase with the addition of device reconstruction following mastectomy, indicating that there is no risk of increased hospital exposure. This finding provides much needed reassurance in the face of conflicting clinical guidelines during the pandemic. In an April 2020 survey of plastic surgeons who routinely perform breast reconstruction, the vast majority of surgeons (95%) cited adherence to American Society of Plastic Surgeons, state, or institutional policy, but only 35% continued to offer implant reconstruction during the pandemic.[23] This finding by Sarac et al not only suggests a lack of consistency in practice guidelines, but also reflects a generally conservative attitude when deciding to offer breast reconstructive surgery. Our study shows that, from the standpoint of hospital exposure, mastectomy, which is deemed high-acuity by the Center for Medicare and Medicaid Service and other authorities,[3–5] can be safely followed by device reconstruction. Immediate reconstruction would also eliminate the additional surgery needed for delayed reconstruction. On the other hand, "babysitter" tissue expander or implant placement at the time of mastectomy can help preserve the breast skin envelop until definitive reconstruction can be safely done.[5]

At our institution, a tertiary and quaternary care center in New York City, we have observed similar morbidity rates between mastectomy patients with and without immediate device reconstruction, confirming the findings in our ACS-NSQIP analysis. Further, there has been an institutional push to perform mastectomy in low-risk patients as an outpatient procedure. As device placement adds little to the overall risk profile, it has been deemed acceptable to concurrently offer this surgery on an ambulatory basis. During the initial COVID-19 surge in New York City, elective procedures, including breast reconstruction, were suspended by our institution due to an overwhelmed system and the deployment of personnel and resources. As COVID-19 cases and hospitalizations began to decline at the end of May 2020, postmastectomy reconstruction resumed. From our experience performing tissue expander and implant reconstruction during the lull and subsequent peaks of the pandemic, we have observed no discernable differences in the postoperative course compared with reconstructions performed before

the pandemic. Patients who underwent mastectomy with and without immediate device reconstruction have remained comparable in major postoperative bleeding and hospital LOS. Further, ambulatory mastectomy with tissue expander placement has continued at our institution during the pandemic and was safely performed in a few select patients, who were discharged with no ill effect.

Although device reconstruction immediately following mastectomy likely does not increase major morbidity and hospital LOS during the pandemic, caution must be exercised for patients at high risk for severe COVID-19 infection. Jallali et al, while asserting that IBR should continue to be recommended, also identified patients with certain comorbidities (BMI > 35 kg/m^2, diabetes, and chronic cardiac or respiratory disease) who should instead undergo a delayed reconstruction.[24] Further, in the current analysis, we are unable to directly quantify the impact of the added procedure on resource utilization. Mastectomy with immediate reconstruction involves 2 operating teams, greater utilization of PPE, and longer operative times, which decrease the availability of free anesthesiologists and ventilators.[25] This added strain on resources can be mitigated by strategies such as exploring less technically demanding approaches (prepectoral over subpectoral reconstruction) and forming joint breast and reconstructive surgery teams without the assistance of trainees or surgical practitioners.[5] Unplanned readmissions and reoperations following reconstruction also consume resources and personnel that may be necessary to care for COVID+ patients, and thus should be characterized in future studies. Ultimately, the decision to proceed with immediate reconstruction is dynamic, considering individual patient health status and anticipated resource needs in the context of local infection rate, inpatient occupancy, and PPE availability.

This study is limited by the constraints of a retrospective study. While causation cannot be definitively drawn without a randomized controlled trial, propensity matching was appropriately used in this study to reduce the effects of confounders. Another limitation revolves around using transfusion as surrogate for major postoperative bleeding, as there are other indications for transfusion, such as uncorrected preoperative anemia. In our matched cohorts, the MO group had a significantly higher rate of low preoperative hematocrit (27.0% versus 21.9%), potentially contributing to an increased need for postoperative transfusion in these patients and narrowing the difference in transfusion rate relative to the IBR group. Further, the ACS-NSQIP database is largely composed of data from large academic centers, and results drawn from the database may have limited applicability to smaller hospital systems and community centers. Often cited as a limitation in other studies, the database's 30-day postoperative follow-up should not be seen as such in this study. Major bleeding complications tend to occur in the acute postoperative period and would be captured in the database.

While postmastectomy breast reconstruction has many proven benefits, it may also predispose to postoperative morbidity, such as bleeding and hematoma, that prolong LOS and lead to increased hospital exposure. This present study shows that immediate reconstruction via tissue expander or permanent implant following mastectomy does not significantly increase postoperative bleeding risk or length of hospital exposure compared with mastectomy alone, findings that are reinforced by our institutional experience during the pandemic. Therefore, device reconstruction is a safe adjunct for women who are already undergoing mastectomy during the COVID-19 pandemic. Patients who are undergoing mastectomy for breast cancer should also be considered candidates for concurrent device reconstruction, barring significant resource limitations in the local healthcare system.

CONCLUSIONS

Based on propensity-matched cohorts from the 2007–2013 ACS-NSQIP datasets, it can be concluded that relative to mastectomy alone, immediate device reconstruction—with tissue expander or permanent implant—does not predispose patients to greater morbidity in terms of major postoperative bleeding or increase LOS after surgery. With concern for extended inpatient hospitalizations and potential hospital-acquired coronavirus infection during the COVID-19 crisis, tissue expander or implant reconstruction can be safely performed immediately following mastectomy. Further, our institutional experience during the pandemic indicates that select patients can continue to safely undergo mastectomy with device placement on an ambulatory basis.

David M. Otterburn, MD
NewYork-Presbyterian/Weill Cornell Medical Center
525 E 68th Street
New York, NY 10065
E-mail: dmo9004@med.cornell.edu

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