

The Safety of Same-day Discharge after Immediate Alloplastic Breast Reconstruction: A Systematic Review

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Background: Implant-based breast reconstruction can be accomplished in a variety of ways and can result in vastly different postoperative experiences for patients. The COVID-19 pandemic and recent trends have resulted in a shift toward outpatient management of these patients.

Methods: A systematic review of PubMed and Embase databases was conducted. A total of 1328 articles were identified on initial search, and after several rounds of review, a total of four met inclusion and exclusion criteria. Manuscripts were included if postmastectomy alloplastic breast reconstruction was performed, and there was documentation of same-day discharge. This cohort of patients was compared with traditional, planned overnight admission cohorts found in the literature. Objective data compared between groups included preoperative patient factors and postoperative complication rates.

Results: Four studies representing data on a total of 574 patients were included: 289 were same-day discharge and 285 were overnight admission. Patient characteristics of body mass index, radiation, smoking, and bilateral procedures were comparable. Tissue expanders were used more frequently than implants in both cohorts. The rate of overall complications was 33% for same-day discharge and 34% for overnight admission. Rates of major and minor complications, including infection, seroma, and hematoma, were similar. There was no increase in reoperations or readmissions reported in any of the studies.

Conclusions: Same-day discharge after mastectomy with immediate alloplastic reconstruction is a safe approach to treatment in both the ambulatory and hospital setting. There are comparable rates of common complications such as infection, seroma, and hematoma, with no increase in readmission or reoperation. (*Plast Reconstr Surg Glob Open* 2022;10:e4448; doi: [10.1097/GOX.0000000000004448](https://doi.org/10.1097/GOX.0000000000004448); Published online 20 July 2022.)

INTRODUCTION

The expansive field of breast reconstruction is constantly changing, as evidenced by an increasing number of new technologies and innovations in reconstructive breast surgery that have become available within the past half-century.¹⁻³ Current options for breast reconstruction include both autologous tissue or implant-based, either in the immediate or delayed setting relative to the time of mastectomy. Implant-based reconstructions consist of

roughly two-thirds of reconstruction cases and may provide a safe alternative and be less of a burden for patients than the prolonged operative and postoperative course often associated with autologous-based options.^{4,5}

Although two-staged reconstruction with tissue expanders at the time of mastectomy remains a common approach,⁶⁻⁹ direct-to-implant (DTI) reconstruction has become more popular in the past decade, with skin- and nipple-sparing mastectomies more commonly used by breast surgeons, and acellular dermal matrix available for implant support.¹⁰ Advantages of the DTI breast reconstruction may include a reduction in overall health care cost to both the patient and health care system, fewer total procedures, increased patient satisfaction, immediate psychosocial benefits, and overall improvements in quality of life.^{9,11,12} In addition to increased operative efficiency in the setting of immediate breast reconstruction, patients may also have the option to be discharged the day of surgery. However, the safety and efficacy of same-day discharge following immediate breast reconstruction is a

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question that has yet to be fully explored by the plastic and reconstructive literature.

The fast-track or enhanced recovery after surgery (ERAS) model gained momentum in the early twenty-first century, especially in the field of colorectal surgery.^{13,14} Aimed to reduce costs and complications, ERAS has slowly caught on to other surgical fields.^{15,16} In the field of plastic and reconstructive surgery, implementing ERAS initially demonstrated lower morphine equivalent usage, shorter length of hospital stay, and even a reduction in overall complication rates across several studies.^{15,17,18} Recent reviews and meta-analyses on ERAS in breast reconstruction have supported the initial findings on the efficacy of ERAS in reducing length of stay and morphine equivalent dosing; however, in contrast to earlier studies, they did not find that there was a statistically significant difference in complication rates.^{19,20} Components of the ERAS protocol in immediate alloplastic breast reconstruction consist of a preoperative consult preparing the patient for what is to be expected, 6 hours fasting of solid food and 3 hours fasting of clear liquids, the use of a perioperative multimodal pain regimen (acetaminophen, celecoxib, gabapentin, ibuprofen, and liposomal bupivacaine), and postoperative follow-up and counseling.²¹ Incorporating these elements as protocol may be beneficial in reducing the need for unplanned overnight stays among same-day discharge patients.

The increased usage of ERAS has shown that there are many advantages to safely expediting perioperative care, particularly in the immediate postoperative period.^{13,14,21,22} Early studies in the field of breast reconstruction often times pooled delayed and immediate breast reconstruction cases and included ERAS models that aimed to discharge earlier than traditional recovery periods, without specifying an exact discharge timeline.²⁰ Recent research has expanded upon ERAS by implementing same-day discharge, and found that complication rates did not differ when compared with traditional discharges with overnight hospital stays.^{21,23,24}

In the wake of the COVID-19 pandemic, hospitals are implementing new strategies to reduce hospital stays and postoperative complications.²⁵ The ability to offer same-day breast reconstruction, especially when resources are limited, benefits the entire health care team. The authors believe that this study may provide support for better outcomes and resource utilization for patients undergoing immediate implant-based breast reconstruction. As such, the main objective of this review was to identify the feasibility and safety of same-day discharge after postmastectomy immediate alloplastic breast reconstruction. This was evaluated by way of objective patient factors and postoperative complication rates.

METHODS

A systematic review of the research literature was performed to summarize the prevailing understanding of same-day discharge in immediate breast reconstruction when compared with traditional overnight stays, with respect to patient factors and other common

Takeaways

Questions: What is the safety of same-day discharge after immediate, alloplastic breast reconstruction?

Findings: In a systematic review, four studies met inclusion criteria. Patient risk factors, surgical techniques, and complication rates were comparable between same-day discharge and overnight admission.

Meaning: Most evidence shows that in a majority of patients, same-day discharge after immediate, alloplastic breast reconstruction is safe.

postoperative complications. The review was performed by two authors (T.M. and O.S.) over the electronic databases PubMed, Embase, and Medline. The following search terms were entered: (((mastectomy) AND (breast implants)) OR (breast implant)) AND (reconstruction)) AND (((breast reconstruction) AND (ambulatory)) AND (breast implant)) OR (breast implants)) AND (immediate)) OR (direct-to-implant)).

The initial search yielded 1328 articles. After exclusion of non-English articles, there were 1225 articles matching our initial criteria. After exclusion of duplicates, there were 1208 articles. The study was limited to those manuscripts published within the past 5 years from 2016–2021. The remaining 552 articles were screened for review based on title and abstract for further manuscript evaluation. A total of 36 articles were selected for full-text review. In total, seven articles met inclusion criteria, and three articles were excluded for meeting exclusion criteria. Inclusion criteria consisted of studies with documented same-day discharge following immediate alloplastic breast reconstruction. Exclusion criteria consisted of studies that involved mastectomy alone with same-day discharge, same-day discharge following autologous reconstruction, or documented same-day discharge following immediate alloplastic breast reconstruction without use of a control (traditional, overnight) cohort. Patients with body mass index (BMI) more than 35 were also excluded in many of the studies. Four articles met inclusion and exclusion criteria for review and comparison of complication rates as well as patient factors (Fig. 1).

RESULTS

A total of 574 patients were included in our systematic review and comparison of patient factors and complication rates (Table 1). There were 289 patients in the planned same-day discharge group and 285 patients in the planned overnight admission group. The majority of studies evaluated a cohort of more than 50 patients over the course of the last 3–5 years. The average age was 49 among patients in the same-day discharge cohort (Table 2) and 50 (Table 3) in the overnight admission cohort. The average BMI was 27.7 ± 5.3 among patients in the same-day discharge cohort (Table 2) and 27.9 ± 5.0 in those patients who remained overnight (Table 3).

Among studies reporting axillary procedures (lymph node and axillary dissections) and mastectomy techniques,

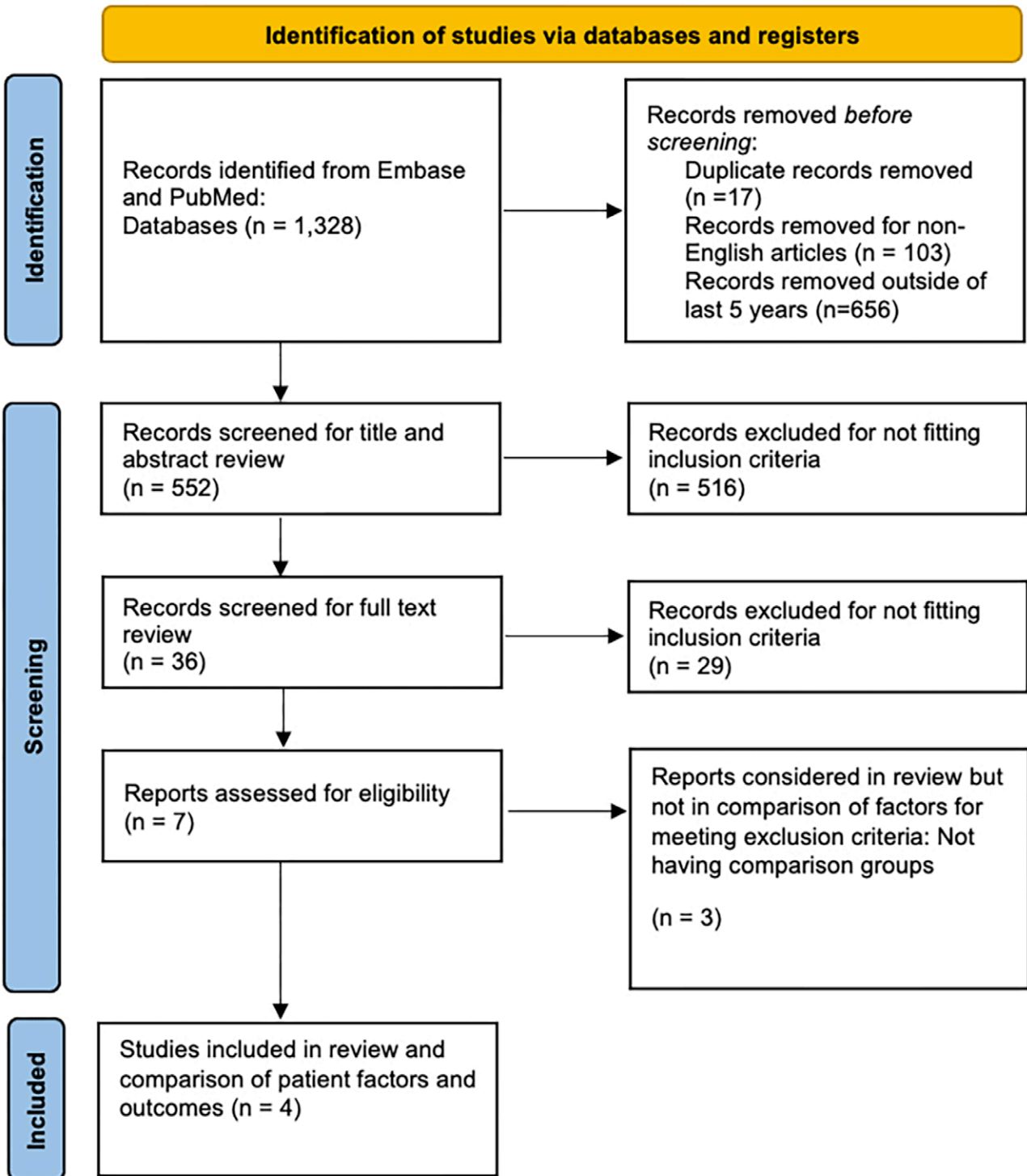


Fig. 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses systematic review process.

there were comparable rates between same-day and overnight admission groups. Among studies reporting rates of neoadjuvant chemotherapy, there were comparable rates between cohorts. Radiation therapy (neoadjuvant or adjuvant) was not uniformly reported; however, there was no increased rate among traditional, overnight admission patients. Two of the four studies rigidly followed ERAS

protocols, and all studies included elements of ERAS. In the same-day discharge group, 82% were bilateral reconstruction versus 74% for the overnight admissions group. Tissue expanders were used more frequently in both cohorts, with 52% in the same-day discharge cohort and 66% in the overnight admission cohort. In terms of placement, both groups reported 51% of implants and

Table 1. Summary of All Studies Included in Review

Authors	PMID	Year	No. Patients	Cohorts	Summary of Findings
Dumestre et al ³⁴	28234819	2017	58	Enhanced recovery versus traditional recovery versus transitional recovery	With enhanced recovery for immediate breast reconstruction, patients were safely discharged same-day with improved patient satisfaction.
Dumestre et al ²¹	29619347	2017	156	Enhanced recovery versus traditional recovery	Enhanced recovery protocol for immediate breast reconstruction is safe with same-day discharge.
Schwartz ³⁶	32802654	2020	209	Ambulatory versus hospital settings for same-day discharge	Patients have a significantly reduced rate of major infectious complications in an ambulatory setting versus a hospital setting. Hospital setting showed comparable rates to similar studies.
Hammond et al ²³	33470624	2021	151	Subgroup analysis of overnight admission versus same-day discharge	Same-day discharge after mastectomy with immediate breast reconstruction is safe.
Total			574		

PMID, PubMed identifier.

expanders in the prepectoral position. There was no difference in rates of smoking and radiation therapy with the same-day discharge cohort being 5% and 15%, respectively, while the overnight admission was 6% and 15%, respectively (Tables 2 and 3).

The average overall complication rate in the 289 same-day discharge patients was 33% (18%–48%) (Table 4), while the 285 overnight admission patients had an average overall complication rate of 34% (24%–51%) (Table 5). Rates of major and minor complications among same-day discharge patients were 12% and 26%, respectively. Rates of major and minor complications among overnight admission patients were 16% and 21%, respectively. Among same-day discharge patients, rates of infection, seroma, and hematoma were 7%, 4%, and 3%, respectively (Table 4). Among overnight admission patients, rates of infection, seroma, and hematoma were 13%, 6%, and 0%, respectively (Table 5) (Fig. 2). Readmissions and reoperations were considered a major complication but were not uniformly reported among the articles included in this review.

DISCUSSION

Mastectomy has traditionally been an inpatient procedure with at least an overnight stay in the hospital. However, in recent years, a majority of breast cases are now performed in an outpatient setting.²⁶ Similar trends have been found among mastectomies with immediate breast reconstruction.²⁷ Alloplastic reconstruction and autologous reconstruction are not equivalent in complication rates, as increased rates of complications are associated with autologous reconstruction.²⁸ Recent studies have supported that there is no difference when comparing complications among mastectomies and mastectomies with immediate alloplastic breast reconstruction.^{29–31} Immediate alloplastic breast reconstruction has also been demonstrated to be safe in the setting of adjuvant radiation therapy. These findings suggest that from both an overall health care cost perspective and the quality-of-life benefit to the patient, same-day discharge should be and may very well become the standard in immediate alloplastic breast reconstruction.

Table 2. Same-day Discharge after Immediate Implant-based Reconstruction Patient Factors

Authors (Y)	Patients (Bilateral %)	Implant versus Tissue Expander	Implant Placement	Age	BMI	Active Smoker (%)	Irradiation (%)
Dumestre et al ³⁴	29 (83)	62% implant	100% subpectoral	48	<35	2 (7)	2 (7)
Dumestre et al ²¹	78 (81)	66% implant	100% subpectoral	45	<35	3 (4)	4 (5)
Schwartz ³⁶	103 (86)	100% tissue expander	100% prepectoral	52	29.6±5.7	8 (8)	20 (20)
Hammond et al ²³	79 (77)	87% implant	56% prepectoral	51	25.3±4.7	1 (1)	18 (23)
Total	289 (82)	52% tissue expander	51% prepectoral	49	27.7±5.3	14 (5)	44 (15)

Table 3. Overnight Admission after Immediate Implant-based Reconstruction Patient Factors

Authors (Y)	Patients (Bilateral %)	Implant versus Tissue Expander	Implant Placement	Age	BMI	Active Smoker (%)	Irradiation (%)
Dumestre et al ³⁴	29 (62)	52% implant	100% subpectoral	48	<35	2 (7)	1 (4)
Dumestre et al ²¹	78 (55)	75% tissue expander	100% subpectoral	49	<35	6 (8)	4 (5)
Schwartz ³⁶	106 (86)	100% tissue expander	100% prepectoral	51	28.8±4.6	11 (10)	18 (20)
Hammond et al ²³	72 (82)	86% implant	56% prepectoral	49	26.6±5.7	0 (0)	21 (29)
Total	285 (74)	66% tissue expander	51% prepectoral	50	27.9±5.0	17 (6)	44 (15)

Table 4. Same-day Discharge after Immediate Implant-based Reconstruction Patient Complications

Authors (Y)	Major Complications (%)	Minor Complications (%)	Infection (%)	Seroma (%)	Hematoma (%)
Dumestre et al ³⁴	1 (3)	6 (21)	2 (7)	1 (3)	1 (3)
Dumestre et al ²¹	6 (8)	31 (40)	7 (9)	1 (1)	1 (1)
Schwartz ³⁶	19 (18)	18 (17)	4 (4)	7 (7)	2 (2)
Hammond et al ²³		14 (18)	6 (8)	1 (1)	4 (5)
Total	26 (12)	55 (26)	19 (7)	10 (4)	8 (4)
		95 (33)			

Table 5. Overnight Admission after Immediate Implant-based Reconstruction Complications

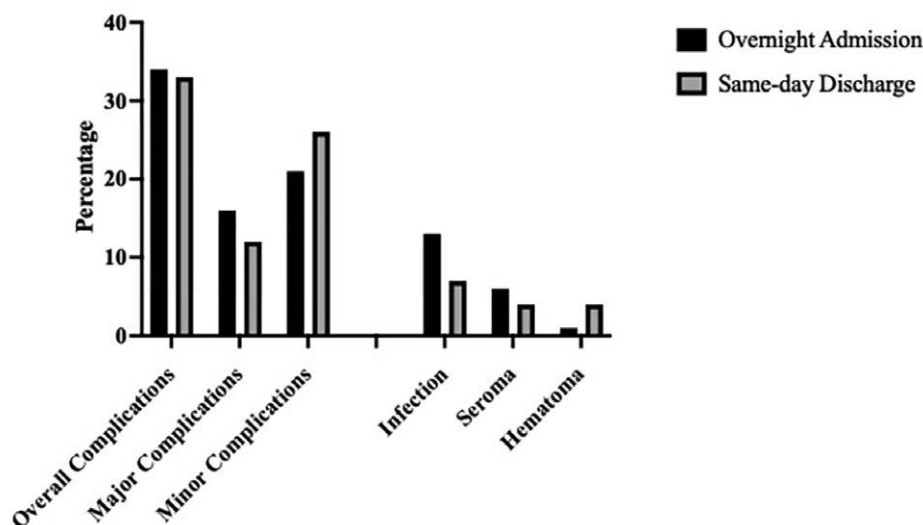
Authors (Y)	Major Complications (%)	Minor Complications (%)	Infection (%)	Seroma (%)	Hematoma (%)
Dumestre et al ³⁴	0 (0)	10 (34)	0 (0)	3 (10)	0 (0)
Dumestre et al ²¹	3 (4)	28 (36)	6 (8)	2 (3)	0 (0)
Schwartz ³⁶	37 (35)	17 (16)	21 (20)	10 (9)	1 (1)
Hammond et al ²³		17 (24)	9 (13)	1 (1)	0 (0)
Total	34 (16)	45 (21)	36 (13)	16 (6)	1 (0)
		96 (34)			

Postoperative Complications

A previous study on immediate DTI breast reconstruction identified complications, such as hematoma, seroma, readmission, and infection, as some of the important endpoints in evaluating postoperative success.³² In a recent study by Hammond et al,²³ when comparing same-day discharge with traditional recovery after surgery, the data showed significantly decreased rates of 90-day complications in patients who went home the same day.

Results of 90-day complications included decreased incidence of hematoma, seroma, mastectomy, and flap necrosis. Hematomas were defined as requiring drainage in clinic or readmission for drainage in the operating room. Postoperative admissions were significantly decreased after enhanced recovery implementation, with no significant difference in unplanned and total reoperations between groups. There were no significant differences between axillary procedures and mastectomy techniques between the two groups (same-day versus

overnight). Two additional studies compared national standard complication rates of overnight discharge to the same-day cohort included in their study. Specht et al²⁵ found, despite a small sample size, no complications were observed in a 30-day postoperative follow-up period of same-day discharge patients. Shaker et al³³ reported findings on immediate implant-based reconstruction, which found comparable rates to national standards in terms of postoperative infection, implant loss, and readmission rates, with no significant difference in overall complications. A series of studies by Dumestre et al³⁴ in 2017 reported similar data on implant-based reconstruction with same-day discharge compared with overnight admission, and focused on postoperative complications within a 30-day period. In the first study, among the groups, there were no significant differences in the number of emergency room visits, hematomas, infections requiring IV antibiotics, or explanations. A subsequent study reported similar findings, showing no difference in major

Comparison of complications determined by discharge status**Fig. 2.** Comparison of complication rates between overnight admission and same-day discharge.

complications, such as postoperative emergency department visits, hematomas, infections requiring IV antibiotics, and/or readmission, as well as the number of minor complications.²¹

A study by Oxley et al³⁵ reported on a large, retrospective cohort of same-day immediate alloplastic breast reconstructions between hospital and ambulatory settings. There was no difference between planned admission and same-day discharge in complication rates, such as infection, dehiscence, seroma, and hematoma. There were also increased rates of unplanned admission when performed at a hospital as opposed to an outpatient center. Schwartz³⁶ conducted a similar study to Oxley et al,³⁵ comparing immediate implant-based reconstruction with same-day discharge performed at a hospital to reconstruction performed at an ambulatory surgery center. There was an increase in major complications in a hospital setting. There were no significant differences between axillary procedures and mastectomy techniques between the two groups (same-day versus overnight). The increased rate of major infections in a hospital setting was comparable to another study that has reported on immediate breast reconstruction with DTI or tissue expanders.³⁷ Jogerst et al²⁴ evaluated differences between pre-ERAS and post-ERAS outcomes for patients undergoing mastectomy with or without breast reconstruction. There were higher rates of complications in the pre-ERAS group. Within the post-ERAS group, patients discharged the same day had no difference in complication rates than those with planned, overnight admissions.

Resource Utilization

With the incorporation of ERAS into plastic surgery over the last two decades, studies have demonstrated decreased opioid usage, as well as decreased hospital resources.^{22,25,38,39} Dumestre et al³⁴ reported that enhanced recovery patients had decreased severe pain and nausea, while increasingly enjoying their food and feeling more rested. Similarly, Schwartz³⁶ reported that patient satisfaction was higher among immediate reconstructions with same-day discharge performed in an ambulatory surgery center. Few studies have looked at patient satisfaction and pain scores among immediate breast reconstruction with same-day discharges, but numerous studies evaluating the efficacy of ERAS in breast reconstruction have shown less opioid use without an increase in complications or pain.^{14,19,20,40} Mastectomy with breast reconstruction, when used in conjunction with ERAS, has also demonstrated decreased hospital resources by decreasing length of stay when compared with traditional recovery after surgery.^{20,22,41,42} The guiding principles of ERAS include optimizing preoperative health, minimizing perioperative injury, and reducing the incidence and risk of postoperative complications. This study summarizes a plethora of data demonstrating among patients with similar preoperative risk factors, there is no increased risk of postoperative complications with same-day discharge after tissue expander and DTI breast reconstruction, with the added benefits to the patient including minimized hospital stay and thus decreased resource utilization. The authors

have integrated the approach of same-day discharge for patients undergoing immediate DTI reconstruction at their institution.

In the institutional execution of same-day discharge, it is imperative that patients are counseled about the benefits of same-day discharge with no increase in risk of complications as demonstrated by the literature. The most commonly feared complications that often lead to emergency department visits and readmission include hematoma and infection. However, the data herein demonstrate no major increased risk of hematoma, infection, or seroma in the 90 days following surgery. It is important to note, however, that a limitation of this study includes the lack of isolated data reporting complications in the immediate 7 days postoperatively during which the majority of hematomas may present. Mastectomy skin flap necrosis may also occur in these patients with several studies demonstrating no increased risk.²⁷ This risk can be reduced by thorough examination of skin flap tissue in the postanesthesia recovery unit before discharge. An overnight stay has not shown any significant difference in the ability to detect skin necrosis sooner.

Although some of the studies included in this review utilized ERAS protocol, it remains to be seen if ERAS protocols are necessary to safely discharging patients same-day following postmastectomy alloplastic breast reconstruction. At our institution, we now routinely perform DTI same-day discharge breast reconstruction without following ERAS protocols. We believe that same-day discharge after immediate alloplastic breast reconstruction is safe without ERAS, and future studies will have to validate this. For institutions rigidly following ERAS protocols, preoperative counseling is vital and will better inform the patient on what to expect, often minimizing an unnecessary return to the emergency room. Making sure the patient and surgeon are on the same page in terms of what is to be expected regarding the postoperative timeline and discharge may be the most important element of successful incorporation of ERAS.^{43,44} The most common reasons why patients planned for same-day discharge end up staying overnight are delayed adoption of protocols or surgeon/patient preference. Complications were not a significant reason for unplanned overnight stays.²³ Additionally, specific contraindications to ERAS and same-day discharge have not been adequately elucidated; however, the authors of this article argue that patients who are safe to undergo immediate alloplastic breast reconstruction are also safe to be discharged same-day if necessary social support and follow-up appointments are in place. Careful consideration is warranted in patients with BMI more than 35.

Limitations of this study stem from the lack of publications with a focus on length of stay as the primary controlled variable. In terms of limitations extending to the patient population, some patients with radiation history may have been kept overnight for observation and extraprecaution. These patients are at higher risk of postoperative complications because of the healing risks and increased complications associated with radiation.⁴⁵⁻⁴⁷ Therefore, patients selected for overnight admission as opposed to same-day discharge may lead to a selection

bias. Additionally, although a majority of planned same-day discharge resulted in same-day discharge, this was not always the case as there were notable exceptions where patients who were planned to be discharged, ended up staying overnight. Furthermore, not all complications (hematoma, seroma, and infection) were uniformly stratified as major or minor. We utilized our best discretion in properly classifying these complications. Another consideration is that in our study, we considered that tissue expander placement and DTI carry roughly the same risk, therefore discharging them same-day could be considered equally. It should also be noted that different forms of implant techniques were utilized, including prepectoral and subpectoral, which may carry different risks for complications associated with same-day discharge versus overnight planned admission; however, the rates between the two groups were comparable.

CONCLUSIONS

Same-day discharge after mastectomy with immediate alloplastic reconstruction is a safe approach to treatment in both the ambulatory and hospital settings. There are comparable rates of complications among common postoperative causes of morbidity, including infection, hematoma, and seroma. There was no reported increase in readmissions or reoperation rates between groups.

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