



DOI: 10.4274/ejbh.galenos.2026.2025-11-11

Eur J Breast Health 2026;22(3):285-293

Safety and Early Outcomes of Immediate Autologous Breast Reconstruction in Advanced Breast Cancer: An Indian Experience

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ABSTRACT

Objective: Post-mastectomy breast reconstruction improves body image and quality of life for women with breast cancer. Most adverse events emerge within the first 90 days and may contribute to long-term morbidity. This study prospectively evaluated the incidence and predictors of early complications following immediate autologous breast reconstruction in women with locally advanced breast cancer.

Materials and Methods: Prospective data from a randomized controlled trial (CTRI/2017/01/007745) involving women undergoing immediate autologous whole breast reconstruction were analysed. Breast and donor-site complications were recorded and graded using Clavien-Dindo classification over 0–30 and 31–90 days. Univariate and multivariate analyses were performed to identify risk factors.

Results: A total of 160 patients were included. The mean age was 37 ± 7 years; body mass index (BMI) was 25.7 ± 4.6 ; 25.6% had comorbidities. Deep inferior epigastric perforator (DIEP) flaps accounted for 85% of reconstructions. Within 0–30 days, 45% developed primary-site complications; 33% developed donor-site complications. At 31–90 days, primary-site complications were reduced to 15%, and donor-site complications to 13%. Re-exploration was required in 11%; however, no flap loss was observed. Univariate analysis showed age >37 , BMI ≥ 25 , diabetes, multiple comorbidities, any comorbidity, and DIEP increased primary-site complication risk and BMI ≥ 25 and DIEP predicted donor-site events. Multivariate analysis confirmed multiple comorbidities and DIEP as predictors of primary-site complications, while BMI ≥ 25 and DIEP predicted donor-site complications. As DIEP flaps predominated, in our patients technique-based comparisons should be interpreted cautiously.

Conclusion: Immediate autologous whole-breast reconstruction in patients with advanced breast cancer undergoing multimodal therapy, including intensive chemotherapy and radiotherapy, resulted in a high overall complication rate but no reconstructive failures, highlighting the need for a selective, individualized approach with comprehensive preoperative counselling and shared decision-making.

Keywords: Surgical complications; breast reconstruction; breast cancer; acute complications; autologous reconstruction

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Received: 11.12.2025 **Accepted:** 01.03.2026 **Available Online Date:** 17.06.2026

Cite this article as: Jose M, Sable S, Wadasadawala T, Sarin R, Pathak R, Krishnamurthy R, et al. Safety and early outcomes of immediate autologous breast reconstruction in advanced breast cancer: an Indian experience. Eur J Breast Health. 2026;22(3):285-293



KEY POINTS

- Early complications were common but manageable, with no flap failures or delays in adjuvant treatment, underscoring clinical safety.
- Higher body mass index and multiple comorbidities emerged as the most significant predictors of postoperative complications.
- Immediate autologous breast reconstruction can be safely performed in selected patients with advanced breast cancer who are undergoing multimodal therapy (chemotherapy and radiotherapy).

Introduction

While breast reconstruction has become widely accepted and accessible in high-income countries (1), its adoption remains limited in low- and middle-income countries (LMIC). For women in LMICs the choice between breast conservation surgery and mastectomy is often challenging. Limited knowledge about the safety of breast-conserving surgery, financial barriers, and concerns regarding the potential side effects of radiotherapy often lead patients to favour mastectomy.

Ideally, every woman undergoing a mastectomy should be offered options for breast reconstruction. However, lack of expertise, lack of thorough knowledge about the nuances of integration of local and systemic therapy, and lack of preoperative counselling about surgical morbidity influence patient confidence in making informed decisions. Early complications (defined as within the first 90 days post-surgery) can have an adverse effect on the long-term aesthetic outcome. Identifying and managing perioperative complications is therefore crucial to improving outcomes and enhancing patient satisfaction and psychological recovery.

Immediate breast reconstruction (IBR) is a desirable option for women undergoing mastectomy in LMIC setting (2). Identifying risk factors for complications is crucial for optimizing patient-reported outcomes. Identifying an individual at high-risk allows health care providers to exercise caution when selecting patients for reconstruction, to discuss reconstruction options with patients and to tailor perioperative assessments.

This study aims to assess factors associated with complications among patients undergoing immediate autologous breast reconstruction at a resource-constrained LMIC referral centre. It will provide an opportunity for shared decision-making regarding surgical care for patients with locally advanced disease who are receiving multimodality treatment including intensive chemotherapy, targeted therapy, and radiotherapy.

Materials and Methods

The study was approved by Tata Memorial Centre Ethics Committee-I (approval number: 1683, date: 12.05.2016) and registered in Clinical Trials Registry-India (CTRI/2017/01/007745); the trial completed accrual between 2016 and 2024. The trial accrued patients with invasive

breast cancer who underwent immediate autologous whole-breast reconstruction following mastectomy and were randomized to receive adjuvant radiotherapy with either conventional fractionation (50 Gy in 25 fractions) or moderate hypofractionation (40 Gy in 15 fractions). This article evaluates 90-day surgical complications among patients enrolled in this trial, assessing both the reconstructed breast and the donor site; this assessment is one of the trial's secondary endpoints.

Study Population

Patients diagnosed with locally advanced invasive breast cancer (stage II–IV, oligometastatic disease treated with curative intent) who were planned for mastectomy followed by immediate autologous whole-breast reconstruction were accrued at a single centre for this open-label randomised controlled trial.

Surgical Details

Primary autologous reconstruction is preferred amongst our cohort of patients due to various factors such as extent of skin resection, cost of a staged procedure, distance from place of treatment etc. The body morphology of South Asian patients makes the lower abdomen a favourable donor site for autologous reconstruction. Hence, most of our patients undergo the deep inferior epigastric perforator (DIEP) flap reconstruction. Other donor sites are evaluated only when the abdominal donor site is inadequate or the patient is nulliparous. None of the patients had an implant-based reconstruction.

Data Collection

Demographic, clinical, and treatment data for all patients were maintained prospectively. Demographics included age, comorbidities, and body mass index (BMI). Surgical variables included flap type, pedicle status, flap weight, and reconstruction time. The incidence and severity of morbidity at the recipient and donor sites were recorded separately for all patients. All events, regardless of severity, were captured independently during 0–30 days and 31–90 days. Patients who experienced multiple complications were identified, and the percentage of each complication type was calculated separately for both the recipient and donor sites. Complications at recipient and donor sites were recorded for the 0–30-day and 31–90-day periods, and cumulative complication rates were reported for the entire 90-day postoperative period.

Definition of Surgical Morbidity

Surgical morbidity was assessed using the Clavien-Dindo scoring system based on the type and severity of intervention required to manage them (3). The Clavien-Dindo classification categorizes complications into five grades (I–V): Grade I represents complications requiring only medical treatment (antiemetics, antipyretics, analgesics, diuretics, electrolytes, and physiotherapy); grade II refers to complications requiring pharmacological treatment (drugs other than those used for grade I); grade III involves complications requiring surgical, endoscopic, or radiological intervention (IIIa for local anaesthesia and IIIb for general anaesthesia); grade IV refers to life-threatening complications requiring intensive care; and grade V indicates death. Complications of breast surgery include seroma, wound infection, necrosis, and bleeding. If multiple complications developed in a single patient, the worst grade was recorded.

Follow-up Schedule

All scheduled and unscheduled visits within 90 days of surgery were captured, and the reasons were recorded. All events of readmissions and reoperations for the management of complications at both the recipient and donor sites were captured and grouped into three time points: 0–30 days, 30–90 days, and 0–90 days.

Statistical Analysis

Descriptive statistics were used to summarize demographic and clinical characteristics, as well as postoperative outcomes. Continuous variables were summarized using mean and standard deviation, whereas categorical variables were expressed as frequencies and percentages. The incidence data for various complications for 0–30 days, 30–90 days, and 0–90 days were reported separately for the recipient and donor sites.

Univariate and multivariate logistic regression analyses were conducted over the 0–90-day period to identify factors associated with wound-related complications. Odds ratios (OR), 95% confidence intervals, and *p*-values were reported. Variables with *p*<0.2 in univariate analysis were included in multivariate models to adjust for confounders. All analyses were carried out using R version 4.5.0.

Results

A total of 160 patients were analysed. The demographic and clinical characteristics are summarized in Table 1. The mean age of the patients was 37±7 years, and the mean BMI was 25.65±4.59. Twelve patients (7.5%) had multiple comorbidities, with hypertension and diabetes being the most common. The types of flaps included DIEP flap, transverse rectus abdominis myocutaneous flap, anterolateral thigh flap, and latissimus

dorsi flap. The majority (85%) of patients underwent IBR using the DIEP-flap. All patients who received chemotherapy and targeted therapy in the form of neoadjuvant and/or adjuvant treatment and adjuvant radiotherapy had locally advanced disease. Most patients had T3-T4 disease (72.5%). Neoadjuvant

Table 1. Demographic data

Demographics	Overall (number/percent)
Age (mean SD)	37.3±7.1
Comorbidities*	
No comorbidities	119 (74.3%)
Diabetes mellitus	17 (10.6%)
Hypertension	14 (8.75%)
Tuberculosis	6 (3.75%)
Thyroid disorders	20 (12.5%)
Bronchial asthma	2 (1.25%)
BMI	
Normal weight (18.5–24.9)	77 (48.2%)
Overweight (25.0–29.9)	58 (36.2%)
Obese (≥30)	25 (15.6%)
Laterality	
Right	76 (47.5%)
Left	84 (52.5%)
T stage	
T1,T2	44 (27.5%)
T3,T4	116 (72.5%)
Chemotherapy	
Neoadjuvant chemotherapy	83 (51.9%)
Surgery between 2 regimens of chemotherapy	57 (35.6%)
Adjuvant chemotherapy	20 (12.5%)
Type of reconstruction	
DIEP#	136 (85%)
LD# flap	13 (8.1%)
Others**	11 (6.9%)
Pedicle status, n (%)	
Single pedicle	146 (91.2%)
Bipedicle	14 (8.8%)
Flap weight (grams) (mean ± SD)	704±244
Reconstruction time (mean ± SD)	6 hrs 30 minutes ±1 hour

*includes patients with multiple comorbidities, hence the total number of complications do not sum up to the total number of patients.

**others included flaps based on TRAM, superior gluteal artery based, and ALT flap

#: DIEP: Deep inferior epigastric perforator; LD: Latissimus dorsi; BMI: Body mass index; SD: Standard deviation; TRAM: Transverse rectus abdominis myocutaneous flap; ALT: Anterolateral thigh

chemotherapy (NACT) was offered to 83 (51.9%) patients, adjuvant chemotherapy to 20 (12.5%), and surgery was performed between the two regimens in 57 (35.6%) patients. Patients received various chemotherapy regimens, most commonly anthracycline-cyclophosphamide combinations followed by taxane-based therapy, administered in the neoadjuvant and/or adjuvant settings. In human epidermal growth factor receptor 2-positive patients, trastuzumab was added to the taxane regimen, whereas in those with triple-negative breast cancer, platinum agents were combined with taxanes. In patients receiving NACT ($n = 83$), 79 (95%) started radiotherapy within 90 days of surgery, with a median time to radiotherapy of 50 days [interquartile range (IQR) 40–64]. In the remaining 4 patients, radiotherapy was delayed by more than 90 days. Two of them had wound complications; one reported late for radiotherapy; and one developed local chest wall recurrence. Among patients receiving adjuvant chemotherapy, all started chemotherapy within 90 days post-surgery, with a median of 28 days (IQR: 21–42). For these patients, the median time from the last chemotherapy cycle to initiation of radiotherapy was 29 days (IQR: 21–38.5). The distribution of dose fractionation was 48.5% in the conventional arm and 49.4% in the test arm. Three patients did not receive radiotherapy because they developed metastatic disease.

Morbidity at the Primary Site

During the 0–30-day period, flap complications occurred in 72 patients (45%), decreasing to 15% in the 31–90-day period. Overall, in the 0–30-day period, the most frequent complication was wound infection ($n = 53$, 73.6%). The majority ($n = 46$, 87%) of wound infections were classified as Clavien-Dindo grade III complications, and one was a grade IV complication. Partial necrosis was seen in 23 patients (31.9%), and seroma in 16 patients (22%). Twelve patients had multiple complications, including infection, seroma, and necrosis. In the 31–90-day period, 24 patients (15%) reported complications. Wound infection remained the most common complication (83.3%) (Table 2).

During the initial 30-day postoperative period, 10 (6.25%) patients required readmission primarily due to wound infections; an additional 8 (5.0%) patients required readmission between days 31 and 90, also predominantly for wound infections (Table 3). In nine patients, infections were caused by Methicillin-resistant *Staphylococcus aureus* (MRSA), with three of them also showing growth of other organisms, such as *Klebsiella*, *Pseudomonas*, and *Enterobacter*. The rest of the patients had non-MRSA growth. Additionally, eighteen patients (11.25%) required re-exploration on the first post-operative day, primarily due to venous insufficiency, but there were no flap failures. Overall, complications were more frequent and more severe in the early period. The overall complication rate at the primary site during the 0–90-day period was 46.8% (75 patients), of which 93.4% were grade III (Table 3).

Morbidity at the Donor Site

Donor site complications occurred in 52 patients (32.5%) during the initial 30 days, decreasing to 21 patients (13.8%) in the 31–90-day period. Wound infection was the most common complication at the donor site during both the 0–30-day and 31–90-day postoperative periods (Table 4). Five patients had multiple complications, including a combination of infection, seroma, and necrosis. Only 8 (5%) patients required readmission in the 0–30 days, and 6 (3.7%) patients required readmission in the 31–90 days for donor-related complications. Infection with MRSA was the most common reason for readmission in both periods. The overall complication rate was 36.8% (59 patients) during the 0–90-day period; 86.4% were grade III (Table 3).

Univariate Analysis

The factors analysed included age, BMI, obesity, presence of diabetes mellitus, other comorbidities, type of chemotherapy regimen, and reconstruction technique. Patients older than 37 had significantly higher odds of primary site complications (OR = 2.22, $p = 0.014$) compared with younger patients. Higher BMI ≥ 25 (OR = 2.06, $p = 0.025$), presence of diabetes alone (OR = 3.05, $p = 0.046$) or multiple comorbidities (OR = 3.67, $p = 0.018$) or any comorbidity (OR=2.48, $p=0.015$) was associated with increased

Table 2. Morbidity at primary site

Clavien-Dindo grade*	Wound infection		Necrosis		Seroma	
	0–30 d (n, %)	31–90 d (n, %)	0–30 d (n, %)	31–90 d (n, %)	0–30 d (n, %)	31–90 d (n, %)
Grade I	3 (5.7)	1 (4.2)	2 (8.7)	1 (25)	4 (25)	0 (0)
Grade II	3 (5.7)	3 (12.5)	1 (4.35)	0 (0)	0 (0)	0 (0)
Grade IIIa	38 (71.7)	15 (62.5)	15 (65.2)	3 (75)	10 (62.5)	2 (100)
Grade IIIb	8 (15)	5 (20.8)	4 (17.4)	0 (0)	2 (12.5)	0 (0)
Grade IV	1 (1.9)	0 (0)	1 (4.35)	0 (0)	0 (0)	0 (0)
Total cases	53 (100)	24 (100)	23 (100)	4 (100)	16 (100)	2 (100)

*Includes patients with multiple conditions such as wound infection, necrosis, seroma reported as per worst grade

complications. Non-DIEP reconstruction was associated with a lower OR for developing complications (OR = 0.32, $p = 0.025$). For donor site, higher BMI ≥ 25 was significantly associated with increased complication rate (OR = 2.56, $p = 0.005$) and non-DIEP reconstructions had lower OR for complication rate (OR = 0.25, $p = 0.017$). Age >37 , the presence of multiple comorbidities or any comorbidity, and NACT were associated with an increased risk of complications, but the associations were not statistically significant (Table 5 and Table 6).

Multivariate Analysis

At the primary site, the presence of multiple comorbidities and DIEP reconstruction were significantly associated with higher complication rates on multivariate analysis. At the donor site, higher BMI and DIEP reconstruction were significantly associated

with higher complication rates (Table 5 and Table 6). As DIEP flaps constituted the majority of reconstructions (85%), the non-DIEP comparison group was relatively small and heterogeneous, which may limit the robustness of technique-based comparisons.

Discussion and Conclusion

Despite the well-recognized benefits of breast reconstruction, uptake remains low in India and similar LMIC settings. A previous study from our institution reported an acceptance rate of only 27% and showed that the interest of patients in delayed reconstruction was low (2). A Central India survey of 192 patients found that none opted for post-mastectomy reconstruction over two years, preferring to avoid additional surgery despite its psychological benefits (4). Additionally, considering limited resources, expertise, and costs, there was a preference for immediate autologous reconstruction over implant-based reconstruction.

In LMIC contexts, perioperative complications after whole breast reconstruction carry greater implications—disrupting cancer adjuvant treatment schedules, affecting body image, increasing healthcare costs, and potentially straining limited resources. Documentation of complications is, therefore, a critical quality-of-care measure. To our knowledge, this is the only prospective Indian study with a reasonable sample size to evaluate early surgical complications at both flap and donor sites after immediate autologous reconstruction in patients with locally advanced breast cancer receiving multimodality treatment in the form of chemotherapy and radiotherapy and to identify risk factors. Previous Indian studies, both prospective (5) and retrospective (6), had much smaller cohorts and did not analyse risk factors.

In the present study, complications of the reconstructed breast occurred in 46.8% of patients, and donor-site complications occurred in 36.8% of patients, within 90 days. These rates fall within the upper range of those reported in international series of immediate autologous breast reconstruction, in which

Table 3. Breast and donor site complications 0–90 days

Complications	Breast (N=75)*	Donor site (N=59)*
Wound infection	68 (42.4%)	69 (43.1%)
Seroma	18 (11.3%)	-
Necrosis	22 (13.75%)	2 (1.2%)
Hematoma	-	2 (1.2%)
Clavien-Dindo grading [#]		
Grade I	1 (1.3%)	2 (2.7%)
Grade II	4 (5.3%)	6 (8%)
Grade IIIa	59 (78.7%)	44 (58.7%)
Grade IIIb	11 (14.7%)	7 (9.3%)
Grade IV	1 (1.3%)	1 (1.6%)
Re-exploration day 1	18 (11.25%)	2 (1.2%)
Re-admission		
0–30 days	10 (6.25%)	8 (5%)
31–90 days	8 (5%)	6 (3.7%)

*Due to the occurrence of multiple complications in some patients, the total number of complications do not sum up to the total number of patients.
#: For patients with multiple complications, a higher Clavien-Dindo grade is assigned based on the most severe complication

Table 4. Morbidity at donor site

Clavien-Dindo grade*	Wound infection		Necrosis		Seroma		Hematoma	
	0–30 d (n, %)	31–90 d (n, %)	0–30 d (n, %)	31–90 d (n, %)	0–30 d (n, %)	31–90 d (n, %)	0–30 d (n, %)	31–90 d (n, %)
Grade I	7 (12.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Grade II	6 (10.3)	3 (11.1)	0 (0)	0 (0)	1 (33.3)	0 (0)	0 (0)	0 (0)
Grade IIIa	36 (62.0)	19 (70.4)	1 (50)	0 (0)	2 (66.7)	0 (0)	0 (0)	0 (0)
Grade IIIb	8 (13.8)	5 (18.5)	1 (50)	0 (0)	0 (0)	1 (100)	2 (100)	0 (0)
Grade IV	1 (1.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total cases	58 (100)	27 (100)	2 (100)	0 (100)	3 (100)	1 (100)	2 (100)	0 (100)

*Combined complications include patients with multiple conditions such as wound infection, necrosis, seroma reported as per worst grade

overall complication rates of approximately 30–40% have been reported (7-9).

Wound infection was the most frequent complication in this study, accounting for the majority of early adverse events. The observed infection rate 42% at primary site, 43% at donor site was higher than that reported in large Western prospective cohorts such as the Mastectomy Reconstruction Outcomes Consortium, where infection rates of approximately 4–10% have been documented (8, 9). This difference is likely multifactorial and may reflect the higher prevalence of obesity and diabetes in our population, the advanced stage of disease requiring more frequent use of NACT, and differences in perioperative and post-discharge wound care practices. Similar associations between

metabolic comorbidities and increased infection risk have been consistently reported in prior studies (10-13). The rates of partial flap necrosis and seroma formation observed were comparable to those reported in other microsurgical breast reconstruction series, where minor necrosis and seroma were among the most frequent non-infectious adverse events (7, 14).

Re-exploration was required in 11.2% of patients, most commonly due to venous insufficiency. This rate is comparable to published microsurgical series reporting re-exploration rates between 7% and 12% (14, 15). Beugels et al. (14) reported a lower re-exploration rate of approximately 7% in their retrospective cohort of DIEP flap reconstructions. Emergency re-exploration has been shown to be associated with a higher risk of subsequent

Table 5. Univariate and multivariate analysis for complications at primary site at 0-90 days

Characteristic	n	Event n	Univariate OR* (95% CI*)	p-value	Multivariate OR* (95% CI*)	p-value
Age						
≤37 (ref)	87	33	-	-	-	-
>37	73	42	2.22 (1.18–4.22)	0.014	1.93 (1.00–3.80)	0.053
BMI						
<25 (ref)	77	29	-	-	-	-
≥25	83	46	2.06 (1.10–3.90)	0.025	-	-
Obesity (BMI ≥30)						
No (ref)	137	65	-	-	-	-
Yes	23	10	0.85 (0.34–2.07)	0.724	-	-
Diabetes mellitus						
No (ref)	143	63	-	-	-	-
Yes	17	12	3.05 (1.07–9.99)	0.046	-	-
Multiple comorbidities						
No (ref)	141	61	-	-	-	-
Yes	19	14	3.67 (1.33–11.9)	0.018	3.56 (1.16–12.8)	0.035
Any comorbidity						
No (ref)	119	49	-	-	-	-
Yes	41	26	2.48 (1.20–5.25)	0.015	-	-
Neoadjuvant chemotherapy received						
No (ref)	20	8	-	-	-	-
Yes	140	67	1.38 (0.54–3.71)	0.511	-	-
Chemotherapy regimen						
Neoadjuvant (ref)	83	42	-	-	-	-
Sandwich	57	25	0.76 (0.39–1.50)	0.433	-	-
Adjuvant	20	8	0.65 (0.23–1.74)	0.396	-	-
Type of reconstruction						
DIEP# (ref)	136	69	-	-	-	-
Other flaps	24	6	0.32 (0.11–0.82)	0.025	0.28 (0.09–0.73)	0.014

*OR: Odds ratio; CI: Confidence interval; BMI: Body mass index
#: DIEP: Deep inferior epigastric perforator

Table 6. Univariate and multivariate analysis for complications at donor site at 0-90 days.

Characteristic	n	Event n	Univariate OR* (95% CI*)	p-value	Multivariate OR* (95% CI*)	p-value
Age						
≤37 (ref)	87	30	-	-	-	-
>37	73	34	1.66 (0.88–3.15)	0.121	-	-
BMI						
<25 (ref)	77	22	-	-	-	-
≥25	83	42	2.56 (1.34–4.99)	0.005	2.25 (1.16–4.47)	0.018
Obesity (BMI ≥30)						
No (ref)	137	55	-	-	-	-
Yes	23	9	0.96 (0.38–2.34)	0.927	-	-
Diabetes mellitus						
No (ref)	143	54	-	-	-	-
Yes	17	10	2.35 (0.85–6.83)	0.101	-	-
Multiple comorbidities						
No (ref)	141	53	-	-	-	-
Yes	19	11	2.28 (0.87–6.24)	0.096	2.44 (0.88–7.22)	0.092
Any comorbidity						
No (ref)	119	43	-	-	-	-
Yes	41	21	1.86 (0.91–3.83)	0.091	-	-
Neoadjuvant chemotherapy received						
No (ref)	20	6	-	-	-	-
Yes	140	58	1.65 (0.62–4.89)	0.333	-	-
Chemotherapy regimen						
Neoadjuvant (ref)	83	33	-	-	-	-
Sandwich	57	25	1.18 (0.60–2.35)	0.629	-	-
Adjuvant	20	6	0.65 (0.21–1.80)	0.421	-	-
Type of reconstruction						
#DIEP (ref)	136	60	-	-	-	-
Other flaps	24	4	0.25 (0.07–0.71)	0.017	0.26 (0.07–0.78)	0.025
*OR: Odds ratio; CI: Confidence interval; BMI: Body mass index						
#: DIEP: Deep inferior epigastric perforator						

postoperative infection, which may partially explain the infection burden observed in our study (16).

Notably, no cases of total flap loss were observed in the present cohort. This finding aligns with contemporary reports demonstrating flap survival rates exceeding 95% in experienced centres (15, 17). The absence of flap loss is particularly reassuring given the high-risk nature of this population, characterized by locally advanced disease and exposure to chemotherapy and radiotherapy. This underscores the importance of meticulous microsurgical technique, close postoperative monitoring, and early intervention when vascular compromise is suspected.

Donor-site morbidity occurred in 36.8% of patients, predominantly due to wound infection and seroma formation. This pattern mirrors finding of multi-institutional studies of abdominally based free flaps, where donor-site complications range from 20–40% and are strongly influenced by BMI and metabolic comorbidities (18-20). Our early donor-site infection rate (8.1% within 30 days) falls within the range reported in contemporary series (20).

Higher BMI and multiple comorbidities emerged as independent predictors of postoperative morbidity in our study. This observation is consistent with a substantial body of literature demonstrating obesity and diabetes as major risk factors for both

recipient- and donor-site complications following autologous breast reconstruction (10-13, 18, 19). Although abundant donor tissue may be technically advantageous in obese patients (12), our data suggest that when BMI exceeds 25 kg/m², the risk of postoperative complications rises significantly. These findings reinforce the importance of incorporating patient-related risk factors into preoperative counselling and shared decision-making.

Chemotherapy sequencing remains an important consideration in LMICs, where high patient volumes and limited operating room availability may lead to unavoidable delays in surgical scheduling. Our study found no increased complication risk with neoadjuvant or adjuvant chemotherapy, aligning with some but not all literature (15, 21, 22).

Compared to Western data, our patient population is younger (mean age 37 vs. 47–53 years) (8, 9, 23), with locally advanced disease, has exclusively undergone immediate autologous reconstruction, and presents a different comorbidity profile. In contrast, implant-based reconstruction is the dominant approach in high-income countries (1, 8, 9).

Globally, pooled data suggest that reconstruction increases surgical complications compared with mastectomy alone (24). Our planned matched-pair analysis will compare 90-day morbidity between patients undergoing mastectomy alone and those undergoing mastectomy with reconstruction in India.

Study Limitations

While our prospective single-centre design strengthens the validity of the findings, limitations include a modest sample size and the absence of a mastectomy-only comparator group. Additionally, the association between DIEP reconstruction and higher complication rates should be interpreted cautiously, given the marked predominance of DIEP flaps and the small, heterogeneous non-DIEP subgroup. The observed association may be confounded by factors such as case complexity, higher BMI, and multiple comorbidities. Nonetheless, our results provide valuable region-specific data, informing clinicians and patients about the morbidity profile of immediate autologous breast reconstruction in an Asian LMIC context. The findings highlight the need for individualized patient counselling, optimization of comorbidities, and improved perioperative care pathways-essential for the safe adoption of reconstruction in resource-constrained environments.

Although there was no flap loss or delay in adjuvant therapy, the high overall complication rate highlights the need for a selective, individualized approach, with comprehensive preoperative counselling and shared decision-making. These complication rates should be interpreted in the context of multimodal oncologic treatment, including radiotherapy and chemotherapy. Higher BMI

and comorbidities emerged as key predictors of post-operative morbidity, underscoring the importance of careful patient selection. Taken together, these findings support the short-term surgical safety of immediate autologous whole-breast reconstruction in patients with advanced breast cancer who are undergoing multimodal therapy in low- and middle-income settings.

Ethics

Ethics Committee Approval: The study was approved by Tata Memorial Centre Ethics Committee-I (approval number: 1683, date: 12.05.2016) and registered in Clinical Trials Registry-India (CTRI/2017/01/007745)

Informed Consent: All patients were counselled followed by accrual after signing of informed consent form.

Footnotes

Authorship Contributions

Surgical and Medical Practices: M.J., S.S., T.W., R.S., R.P., R.K., S.J., V.S., D.J., S.M., M.M.; Concept: M.J., S.S., T.W., R.S., R.P., R.K., S.J., V.S., D.J., S.M., M.M.; Design: M.J., S.S., T.W., R.S., R.P., R.K., S.J., V.S., D.J., S.M., M.M.; Data Collection or Processing: M.J., S.S., T.W.; Analysis or Interpretation: M.J., S.S., T.W.; Literature Search: M.J., S.S., T.W., S.J.; Writing: M.J., S.S., T.W., S.J., S.M.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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