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OUTCOMES OF BREAST RECONSTRUCTION USING EXTENDED LATISSIMUS DORSI FLAP (ELDF) AT K HOSPITAL

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ABSTRACT

Objectives: To evaluate the early outcomes of breast reconstruction using the extended latissimus dorsi flap (eLDF) in patients with breast cancer treated at K Hospital.

Subjects and Methods: A retrospective descriptive study was conducted on 41 breast cancer patients who underwent breast reconstruction using the extended latissimus dorsi flap from April 2024 to October 2025 at the Department of Breast Surgery, K Hospital. Study variables included clinical characteristics, surgical methods, surgical outcomes, intraoperative and postoperative complications, cosmetic outcomes, and postoperative quality of life.

Results: The mean patient age was 41 ± 2.3 years, and the mean BMI was 23.5 ± 0.8. The mean clinical tumor size was 2.7 ± 0.6 cm. Modified radical mastectomy was the most commonly performed procedure, accounting for 83.4% of cases. The conventional eLDF technique was predominantly used (59.5%). The mean operative time was 160 ± 23.3 minutes, and the mean estimated blood loss was 85.2 ± 5.6 mL. The mean postoperative hospital stay was 12.5 ± 0.6 days. The most common early complication was donor-site seroma in the back region (28.6%). Partial flap necrosis occurred in 4.8% of patients. No cases of total flap necrosis were recorded. Most patients achieved favorable cosmetic outcomes and were satisfied with the appearance of the reconstructed breast.

Conclusion: Breast reconstruction using the extended latissimus dorsi flap is a safe and feasible technique that provides favorable cosmetic outcomes with acceptable complication rates. This method is particularly suitable for patients who are not candidates for microsurgical flap reconstruction or who have poor chest wall tissue quality.

Keywords: Breast cancer; breast reconstruction; extended latissimus dorsi flap; eLDF; reconstructive surgery.

1. INTRODUCTION

Breast reconstruction using the extended latissimus dorsi flap (eLDF) is a well-established autologous reconstructive option for patients undergoing mastectomy, particularly in cases where abdominal free flaps or implant-only reconstruction are unsuitable. Previous studies have demonstrated that eLDF reconstruction provides reliable flap viability, favorable aesthetic outcomes, and acceptable complication rates with low risk of total flap loss [1]. In addition, latissimus dorsi–based reconstruction remains an important technique for patients with poor chest wall tissue quality, previous reconstructive failure, or contraindications to microsurgical reconstruction [2, 3]. Donor-site seroma remains the most commonly reported complication, although most cases can be managed conservatively without compromising reconstructive outcomes [4].

In recent years, increasing attention has been directed toward patient-reported outcomes and quality of life following breast reconstruction. Studies using the BREAST-Q questionnaire have shown that autologous reconstruction techniques, including eLDF, are associated with high levels of breast satisfaction and improvements in psychosocial and sexual well-being [5, 6]. However, in Vietnam, the number of in-depth studies on extended latissimus dorsi flap breast reconstruction remains limited, particularly studies simultaneously evaluating surgical outcomes, cosmetic results, and postoperative quality of life. Therefore, we conducted this study to evaluate the early outcomes of breast reconstruction using the extended latissimus dorsi flap at K Hospital.

2. SUBJECTS AND METHODS

2.1. Study Design and Population

This retrospective descriptive case-series study was conducted on 41 breast cancer patients who underwent breast reconstruction using the extended latissimus dorsi flap (eLDF) at the Department of Breast Surgery, K Hospital, from April 2024 to October 2025. Convenience sampling was applied, and all patients meeting the inclusion and exclusion criteria during the study period were enrolled.

- Inclusion Criteria

Patients were eligible if they had histopathologically confirmed breast cancer according to the UICC 2017 classification and had indications for immediate or delayed breast reconstruction. Eligible patients included

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those with insufficient residual breast skin for reconstruction, failed implant-based reconstruction, partial flap necrosis after DIEP flap reconstruction, or tumors too large for skin-sparing mastectomy. All patients underwent breast reconstruction using the extended latissimus dorsi flap technique, with or without implant augmentation. Patients also underwent comprehensive contralateral breast assessment, including clinical examination, mammography, breast ultrasound, and/or breast MRI. Complete medical records were required for study inclusion.

- Exclusion Criteria

Patients were excluded if they had stage IV breast cancer, skin invasion or skin lesions, pectoralis muscle invasion, thoracodorsal vascular injury, severe systemic disease precluding prolonged surgery, obesity, high upper-extremity physical activity demands, previous back injury or trauma, or the need for very large-volume breast reconstruction or augmentation. Patients who declined participation in the study were also excluded.

2.2. Study Procedure

Patients who met the study criteria were included and underwent breast reconstruction using the extended latissimus dorsi flap technique. Study outcomes included demographic and clinical characteristics, early surgical outcomes, cosmetic outcomes evaluated using the Lowry–Carlson scale, and postoperative quality of life assessed using the Breast-Q questionnaire.

2.3. Statistical Analysis

Data were processed and analyzed using SPSS version 20.0.

3. RESULTS

Table 1. Characteristics of the Study Population

Characteristics	Max	Min	Mean
Age	56	32	41 ± 2.3
BMI	26	20	23.5 ± 0.8
Clinical tumor size (cm)	4.1	2.5	2.7 ± 0.6
Radiological tumor size (cm)	4.2	2.6	2.7 ± 0.7
Bra cup size	36	32	33.1 ± 0.8
	N		%
Surgical procedure for breast cancer			
Modified radical mastectomy (MRM)	35		83.4
Nipple-sparing mastectomy (NSM)	2		5.7
Skin-sparing mastectomy (SSM)	5		14.3
Reconstruction technique			
Conventional eLDF	25		59.5
Endoscopy-assisted eLDF	12		25.6
Endoscopic harvest eLDF	1		2.4
eLDF combined with implant	4		9.5

As shown in Table 1, the mean age of patients was 41 ± 2.3 years, ranging from 32 to 56 years. The mean BMI was 23.5 ± 0.8. The mean clinical tumor size was 2.7 ± 0.6 cm, while the mean radiological tumor size was 2.7 ± 0.7 cm. The average bra cup size was 33.1 ± 0.8, indicating that most patients had small-to-moderate breast volume. Modified radical mastectomy was the most frequently performed oncologic procedure, accounting for 83.4% of cases, reflecting the large proportion of patients who were not suitable candidates for skin-sparing or nipple-sparing surgery. Regarding reconstructive techniques, the conventional eLDF approach was most commonly used (59.5%), whereas fully endoscopic flap harvest was performed in only one patient (2.4%).

Table 2. Early Surgical Outcomes

Parameters	Min	Max	Mean
Operative time (minutes)	140	180	160 ± 23.3
Intraoperative blood loss (mL)	85	105	85.2 ± 5.6
Breast tissue volume (g)	250	310	265 ± 31.4
Scar length – donor site (cm)	9	15	13 ± 0.7
Duration of postoperative analgesic use (days)	3	5	4.33 ± 0.5
Drain removal time – donor site (days)	12	15	13.2 ± 1.1
Drain removal time – recipient site (days)	5	8	6.5 ± 0.5
Postoperative hospital stay (days)	10	16	12.5 ± 0.6

Table 2 demonstrates that the mean operative time was 160 ± 23.3 minutes. The average intraoperative blood loss was 85.2 ± 5.6 mL, indicating relatively low surgical bleeding. The mean breast tissue volume removed was 265 ± 31.4 g. The average scar length at the donor site was 13 ± 0.7 cm. Patients required postoperative analgesics for a mean duration of 4.33 ± 0.5 days. The mean drain removal time was 13.2 ± 1.1 days at the donor site and 6.5 ± 0.5 days at the recipient site. The mean postoperative hospital stay was 12.5 ± 0.6 days.

Table 3. Early Complications

Complications	Site	N	%
Seroma	Donor site (back region)	12	28.6
Infection	Donor site (back region)	1	2.4
Bleeding	Donor site (back region)	0	0
Back pain and numbness	Donor site (back region)	0	0
Limitation of arm movement	Donor site (back region)	3	7.1
Seroma	Recipient site (reconstructed breast)	2	4.8
Infection	Recipient site (reconstructed breast)	1	2.4
Bleeding	Recipient site (reconstructed breast)	1	2.4
Skin necrosis of reconstructed breast	Recipient site (reconstructed breast)	0	0

As presented in Table 3, the most common early complication was donor-site seroma in the back region, occurring in 28.6% of patients. Limitation of upper-extremity movement was observed in 7.1% of cases. Recipient-site complications were less frequent, with seroma occurring in 4.8% of patients, while infection and bleeding each accounted for 2.4%. No cases of skin necrosis in the reconstructed breast were recorded.

Table 4. Late Complications

Complications	N	%
Encapsulated back seroma	4	9.5
Reoperation for seroma excision	1	2.4
Partial flap necrosis	2	4.8
Chronic back pain and numbness	2	4.8
Functional limitation (arm movement and bending)	1	2.4

As shown in Table 4, late complications included encapsulated donor-site seroma in 9.5% of patients and partial flap necrosis in 4.8%. Chronic back pain and numbness were also observed in 4.8% of cases. Functional limitation involving arm movement and bending was uncommon, occurring in only one patient (2.4%). Only one patient required reoperation for excision of encapsulated seroma.

Table 5. Cosmetic Outcomes According to the Lowery-Carlson Scale

Evaluation Time	N	%
After 1 week		
Excellent	18	42.9
Good	22	52.3
Fair	2	4.8
Poor	0	0
After 3 months		
Excellent	20	47.6
Good	20	47.6
Fair	2	4.8
Poor	0	0
After 1 year		
Excellent	21	50.0
Good	19	45.2
Fair	2	4.8
Poor	0	0

Table 5 demonstrates progressive improvement in cosmetic outcomes over time. One week after surgery, 42.9% of patients achieved excellent cosmetic results and 52.3% achieved good results. At the 3-month follow-up, the proportion of excellent outcomes increased to 47.6%. After one year, excellent cosmetic outcomes were observed in 50.0% of patients, while 45.2% maintained good results. No patients were classified as having poor cosmetic outcomes throughout the follow-up period.

Table 6. Quality-of-Life Outcomes

Evaluation Time	After eLDF Reconstruction (N = 42)	Preoperative	P
Breast satisfaction	83.24 ± 5.21	66.28 ± 5.14	P <0.01
Psychosocial well-being	79.78 ± 11.71	64.43 ± 3.72	P <0.01
Sexual well-being	65.29 ± 6.86	59.95 ± 6.24	P <0.01
Physical chest well-being	73.75 ± 9.56	63.03 ± 7.99	P <0.01

As presented in Table 6, postoperative quality of life improved significantly following eLDF breast reconstruction across all Breast-Q domains. Breast satisfaction scores increased from 66.28 ± 5.14 preoperatively to 83.24 ± 5.21 postoperatively. Significant improvements were also observed in psychosocial well-being, sexual well-being, and physical chest well-being, with all comparisons reaching statistical significance (P <0.01). These findings suggest that eLDF reconstruction may provide substantial benefits in both aesthetic outcomes and postoperative quality of life for breast cancer patients.

4. DISCUSSION

In the present study, modified radical mastectomy was the most commonly performed oncologic procedure, accounting for 83.4% of cases. This finding reflects the relatively large proportion of patients who were not suitable candidates for breast-conserving surgery or nipple-sparing procedures because of tumor extent or inadequate residual breast skin. The conventional eLDF technique was the predominant reconstructive approach, used in 59.5% of patients. Previous studies have similarly reported that latissimus dorsi–based reconstruction is frequently performed after mastectomy and remains an important reconstructive option for patients who are unsuitable for microsurgical flaps or implant-only reconstruction [1, 7].

The operative outcomes observed in our study were comparable with previously published eLDF series. The mean operative time was 160 ± 23.3 minutes, which falls within the range reported in the international literature for latissimus dorsi flap reconstruction [4, 8]. Intraoperative blood loss remained relatively low, with a mean value of 85.2 ± 5.6 mL. The average postoperative hospital stay was 12.5 ± 0.6 days, while drain removal occurred later at the donor site than at the recipient site, reflecting the greater risk of seroma formation associated with the back donor area. Overall, these findings support the feasibility and safety of the eLDF technique in routine oncologic practice.

Donor-site seroma was the most common early postoperative complication in our study, occurring in 28.6% of patients. This result is highly consistent with previous studies reporting donor-site seroma rates ranging from approximately one quarter to one third of patients undergoing latissimus dorsi flap reconstruction [3, 9]. Most cases in our study were managed conservatively without affecting flap survival or final reconstructive outcomes. Limitation of upper-extremity movement was observed in a small proportion of

patients, whereas no cases of significant chronic donor-site pain were identified during the early postoperative period.

Late complications in our study included encapsulated donor-site seroma in 9.5% of patients and partial flap necrosis in 4.8%. Importantly, no cases of total flap necrosis or major reconstructive failure were recorded. Previous studies have similarly shown that total flap loss after eLDF reconstruction is extremely rare because the flap maintains a reliable vascular pedicle [7, 10]. The low rate of partial flap necrosis observed in our study may reflect careful patient selection, preservation of flap vascularity, and meticulous surgical technique during flap harvest and inset.

Cosmetic outcomes improved progressively over time in our study. According to the Lowery-Carlson scale, the proportion of patients achieving excellent cosmetic outcomes increased from 42.9% after one week to 50.0% after one year. Similar trends have been reported in previous studies, in which aesthetic outcomes improved gradually as postoperative edema resolved and scars matured [11]. The ability of the eLDF technique to provide adequate soft tissue volume and natural breast contour may contribute substantially to patient satisfaction and long-term cosmetic success.

Significant improvements were also observed in all Breast-Q domains, including breast satisfaction, psychosocial well-being, sexual well-being, and physical chest well-being ($P < 0.01$). These findings are consistent with previous BREAST-Q–based studies demonstrating favorable patient-reported outcomes following autologous breast reconstruction [5, 12]. Autologous reconstruction techniques have been shown to provide greater long-term satisfaction and improved quality of life compared with implant-based reconstruction alone, particularly in psychosocial and sexual well-being domains [13]. Overall, our findings support eLDF reconstruction as a safe and effective reconstructive option with favorable aesthetic and quality-of-life outcomes in breast cancer patients.

5. CONCLUSION

Breast reconstruction using the extended latissimus dorsi flap is a safe and feasible technique with accep table complication rates, low risk of flap failure, and favorable cosmetic outcomes. The procedure also significantly improved postoperative quality of life, supporting its role as an effective autologous reconstructive option for selected breast cancer patients.

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