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Original Research Article

LATISSIMUS DORSI MYOCUTANEOUS FLAP RECONSTRUCTION FOR ONCOLOGICAL RESECTIONS – OUR EXPERIENCE

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Abstract

Background: Latissimus Dorsi Myocutaneous Flap (LDMF), first described by Tansini, is a reliable, well-vascularized option for reconstructing postmastectomy and arm defects, with minimal complications and rare flap loss. This study aimed to describe the complications that occur following LDMF reconstruction. **Materials and Methods:** This retrospective study included the case records of 15 patients who underwent LDMF reconstruction at the Government Thoothukudi Medical College between January 2014 and August 2021. The LDMF classified as a type V flap, was carefully harvested as pedicle flap and transferred to the defect. Donor sites were closed primarily or with SSG based on defect size. **Result:** The patients' ages ranged from 25 to 73 years. Both the mean and median age is 48 years. Among the 15 patients, 10 had breast cancer, 2 had phyllodes tumour of the breast, 2 had STS arm and 1 had recurrent dermatofibrosarcoma protuberans of the breast. Among the two patients with STS arm, one required a split skin graft in addition to LDMF for reconstruction. The donor area required SSG in 14 patients and primary closure in 1. Marginal necrosis of the skin of the flap occurred in one patient which required debridement and reconstruction with the SSG. None of the patients had total flap necrosis. Marginal graft loss occurred in the donor area in 4 patients who were managed conservatively. **Conclusion:** Morbidity following pedicled LDMF reconstruction is minimal. Owing to its reliability, ease of harvest, and cost-effectiveness, pedicled LDMF remains a workhorse flap in many centres.

INTRODUCTION

Defects following major oncological resection may require additional procedures to provide adequate coverage. The selected reconstructive procedure should be simple and reliable, with the least morbidity. The introduction and evolution of flaps have revolutionized the field of reconstruction. We present our experience with Latissimus Dorsi Myocutaneous Flap (LDMF) reconstruction for defects following mastectomy and oncological resection in arm. The LD flap was first described by Tansini in 1896 as a cutaneous flap used to cover a defect secondary to mastectomy. In 1906, he incorporated muscle into the flap.[1] In the field of reconstruction, it regained its popularity after a long period. Reliability, good vascularity, ease of harvest, reduced operating time, and an easy learning curve are considered advantages of pedicled LDMF. Complications such as seroma, and flap dehiscence occurred in varying degrees in many series, but the total loss of flap is very rare.[2-6]

Aim

This study aimed to describe the complications that occur following LDMF reconstruction.

MATERIALS AND METHODS

This retrospective study included case records of 15 patients who underwent LDMF reconstruction at the Department of Surgical Oncology, Government Thoothukudi Medical College, between January 2014 and August 2021. This study was approved by the Institutional Ethics Committee.

Inclusion criteria

Patients who underwent LDMF reconstruction were included in the study.

Exclusion criteria

Defects repaired with primary closure were excluded.

Methods: Patients were followed up monthly in the 1st year, two monthly in the 2nd year, three monthly

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in the 3rd year, six monthly in the 4th and 5th years, and yearly thereafter. Follow-up included a clinical examination at each visit and investigation, as indicated.

The latissimus dorsi muscle is a large triangular flat muscle on the back. After a broad origin, the muscle runs towards the axilla and is inserted into the intertubercular groove of the humerus. This muscle adducts, extends, and medially rotates the arm at the glenohumeral joint. The function of this muscle may be preserved in its absence by the shoulder girdle muscle. Mathes and Nahai classified the LD muscle as a type V flap, and its dominant pedicle was the thoracodorsal artery.[7] The vessel enters the underside of the muscle in the posterior axilla. Numerous musculocutaneous perforators from the pedicle allow for a skin island design anywhere on the muscle.

Surface markings were performed preoperatively, with the patient in an upright position. After completion of the tumour resection, the patient was placed in the lateral decubitus position for flap harvest. The skin paddle can be designed transversely, obliquely, or vertically. After marking the skin paddle, the incision was deepened down to the fascia of the muscle and then we routinely take tacking stitches between skin and muscle to avoid shearing injury to the blood supply of the skin paddle. The flap was then elevated using the standard method. Throughout the procedure, extreme care was taken to avoid pedicle injury. We did not follow the practice of routine transection of the thoracodorsal nerve and routine division of the LD muscle near its attachment to the humerus. For postmastectomy defects, the LDMF was transferred to the defect through a subcutaneous tunnel in the axilla in an island pattern [Figure 1].

Figure 1: Phyllodes tumour – Total Mastectomy with LDMF reconstruction

Figure 2: LABC post neoadjuvant chemotherapy-Modified Radical Mastectomy (MRM) with LDMF reconstruction

The tunnel should be sufficiently large to permit easy delivery of the flap into the defect, without strangulating the vascular pedicle. Sometimes, for coverage of extensive postmastectomy defects, the amount of skin paddle required will be very large. In these patients, the LDMF was elevated such that the lateral border of the mastectomy defect became the medial border of the flap when the entire myocutaneous flap was transferred to the postmastectomy defect [Figure 2]. While reconstructing the defect after oncological resection around the arm, the attachment of the LD muscle to the humerus can be transected for adequate flap rotation to reach the defect (Figures 3 and 4). The flap inset was performed according to the requirements. The donor area was either closed primarily or reconstructed using a Split Skin Graft (SSG) [Figure 1 and 2].

Figure 3: STS arm – Wide Monobloc excision with LDMF and SSG

Figure 4: STS arm –Wide Monobloc excision with LDMF

RESULTS

The patient's ages ranged from 25 to 73 years. Both the mean and median age is 48 years. Among the 15 patients, 10 had breast cancer, 2 had phyllodes tumour of the breast, 2 had STS, and 1 had recurrent dermatofibrosarcoma protuberans of the breast (Table 1). Among the 10 patients with carcinoma of the breast, 7 had Locally Advanced Breast Cancer

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(LABC) with prior neoadjuvant chemotherapy, 2 had large raw areas as a complication of postmastectomy flap necrosis and one had a local recurrence following previous treatment. Among the 15 patients, primary closure of the donor area was possible in one. Since the donor area defect was large in the remaining 14 patients, SSG reconstruction was required as an additional procedure to close the defect.

Complications were categorized as flap-related and donor-site-related. We encountered one case of marginal necrosis of the skin of the LDMF that was treated with wound debridement and SSG. This complication occurred in a young patient with recurrent phyllodes tumor.

This patient (25 years old) presented with a rapidly growing recurrent tumour in the right breast six months after the previous surgery. She had already undergone skin and nipple-sparing mastectomy elsewhere for borderline phyllodes tumour. A core biopsy of the recurrent lesion revealed a borderline phyllodes tumour. R0 resection with LDMF reconstruction was performed (Figure 5). In this patient with an extensive postmastectomy defect, the amount of elevated skin paddle was very large. The patient developed marginal necrosis of the skin flap. The patient was treated with wound debridement and SSG. In our study, two patients were referred to us with a large raw area following postmastectomy skin flap necrosis. We performed LDMF reconstruction and they received adjuvant therapy without delay. Among the 2 patients in the STS arm, 1 required SSG in addition to LDMF because of the large size of the resection defect [Figure 3].

None of the patients experienced a total flap loss [Table 2]. Marginal graft loss occurred in the donor area in 4 patients who were managed conservatively.

Figure 5: Recurrent Phyllodes Tumor – Total Mastectomy with LDMF reconstruction

Table 1: Diagnosis.

		Number of patients
Diagnosis	Carcinoma Breast	10
	Phyllodes Tumor	2
	STS Arm	2
	Recurrent DFSP Breast	1

Table 2: Flap-related complications

	Other studies	Total Number of LD Flap	Partial loss of Flap	Total loss of Flap
Flap Related Complications	Banys-Paluchowski et al.[2]	142	Nil	3
	Kallaway et al.[3]	116	Nil	Nil
	Singla et al.[4]	30	2	Nil
	Mohanty et al.[5]	23	Nil	Nil
	Rifaat et al.[6]	14	Nil	Nil
	Our Study	15	1	Nil

DISCUSSION

Reconstruction of postsurgical defects following major oncological resection poses a significant surgical challenge. Free flaps are considered the first-line reconstruction option in the current era of technological advancement based on esthetic advantages. However, not all defects require a free flap to achieve a good outcome, and not every patient is a suitable candidate for a free flap. Given the increased operating time, high cost, technical expertise in the field of microvascular reconstruction, and higher anaesthetic risk in patients with multiple comorbid conditions, pedicle flaps are preferred over free flaps in many low-resource centres.

Breast cancer is the most common cancer in women globally, and its incidence is increasing in India.[8] Majority of breast cancer patients present with locally advanced stages in developing countries like India. Surgery is an integral part of the multimodal treatment of patients with LABC. In some patients with LABC, postmastectomy defects may not be amenable to primary closure. Multiple options are available.[9] The focus of reconstruction should be a simple procedure to achieve good coverage to start the planned adjuvant therapy without delay. The type of reconstruction procedure depends on the institutional protocol. Pedicled LDMF was used as the primary option in our institute. In general, complications of LDMF reconstruction are not worrisome. Total loss of LD flap was very rare and it was not found in many studies.[3-6]

In our study, we did not encounter total flap loss. We observed partial necrosis of the skin at the margin of the LDMF in one of the patients for whom the size of the skin paddle required was very large. Donor-site-related complications, mainly seroma, occurred in many series.[2,4,6-10] Since the defect was very large in most of our patients, the size of the skin paddle required was also very large. Hence, 14 of 15 patients in our series were not eligible for primary closure of donor area defects. All 14 patients underwent SSG for the donor area. Hence, the complications were

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mainly related to SSG in our study. We had 4 cases of minimal marginal graft loss, especially in the upper part of the donor area, which was managed conservatively. Many studies have described various technical modifications to avoid donor site morbidity by performing primary closure of the donor area when the size of the skin paddle was very large.[11-13] In these studies, the additional procedure of SSG reconstruction of the donor site was avoided.

Gupta et al. described a novel technique of creating an 'S' shaped skin paddle, which achieves satisfactory cover of mastectomy defect and at the same time allows primary closure of the donor area.[11] Sahni et al. used Latissimus Dorsi kiss flap without morbidity in their patient.[12] Boomerang type of LD flap was also described for reconstruction of mastectomy defect which allowed primary closure of the donor area.[13]

Hacquebord et al. in their study used a pedicled LD flap for coverage of large and complex soft tissue defects around the elbow with 22% flap-related complications.[14] Mohanty et al. used a pedicled LD flap for the reconstruction of an arm defect without major morbidity.[5] In our study, we performed LDMF reconstruction of the arm defect without morbidity in 2 patients.

CONCLUSION

The morbidity following pedicled LDMF reconstruction was minimal. With reliability, ease of harvest, good vascularity, and cost-effectiveness, pedicled LDMF remains a workhorse in many centres without a free-flap facility.

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