Original Article

Latissimus dorsi myocutaneous flap for cover of soft tissue defects: Experience of a regional cancer center of North East India

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ABSTRACT

Background: Most of the oncological surgeries require extensive resection of tumors and repair of the defects with flaps. **Aim:** In this series the role of using latissimus dorsi myocutaneous flap (LDMF) for oncoplastic replenishment of soft tissue defects involving breast, chest wall, and back was explored. **Materials and Methods:** The patients in this study are cases treated at a regional cancer center in the northeast India. During the period from January 2010-January 2013, 18 cases of LDMF reconstruction were performed in our center and are included in this series. **Results:** The patients were in the age range of 10-50 years with a follow-up period ranging from 6-24 months. All patients underwent immediate reconstruction of the primary defect. In our series out of 18 patients, in 13 patients the flap had healed primarily without flap congestion, margin necrosis, or infection. The following minor postoperative complications were observed, like wound infection with skin necrosis in one patient (5.5%) and seroma formation was see at both the donor site and at the defect site in four patients (22%). **Conclusion**: LDMF should be utilized more often, as it is technically a straightforward procedure that provides adequate coverage of varied defects, acceptable cosmetic outcomes with minimal postoperative complications.

Key words: Breast cancer, breast reconstruction, chest wall reconstruction, latissimus dorsi flap

INTRODUCTION

Cancer surgery requires extensive resection, which results in large soft tissue defects. The latissimus dorsi myocutaneous flap (LDMF) is one of the most reliable and versatile flap used in oncoplastic surgery. LDMF was introduced by Ignio Tanzini in the year 1906.[1] It was popularized by Olivari (1976).[2] It was also used by Quillen in 1978 in the head and neck region. The LD flap procedure is the first technique used for surgical breast reconstruction using autologus tissue.[3] Myocutaneous flap has been widely used for reconstruction of defects in the chest and back.[4,5] The advantages of LDMF are; large volume of tissue is available, excellent range as a pedicled flap, and there is minimal donor site morbidity.[2,6,7] In this series we will analyze the experience of using LDMF for oncoplastic replenishment of soft tissue defects involving the breast, chest wall, and back.

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MATERIALS AND METHODS

The patients in this study are cases treated at a regional cancer center. During the period from January 2010-January 2013, 18 cases of LDMF reconstruction were performed in our center [Table 1]. The following procedures were done in our series of patients, breast reconstruction following lumpectomy in nine patients, reconstruction of soft tissue defect in the back region following excision of soft tissue sarcomas in six patients, and chest wall reconstruction were done in three patients. The patients were in the age range of 10-50 years with a follow-up period ranging from 6-24 months. All patients underwent immediate reconstruction of the primary defect.

In cases with breast lesions those who were not suitable for a flap from the abdomen due to previous abdominal

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Table 1: the age, gender, site of tumor, type of procedure, and repair of donor site distribution of 18 cases of LDMF

Age	Sex	Primary lesion	Surgery	Donor site
35	F	Sarcoma midline dorsum	WLE+LDMF	1^0
38	F	Sarcoma (recurrent) dorsum	WLE+LDMF	1^0+SSG
42	M	Sarcoma dorsum (rt)	WLE+partial scapulectomy+LDMF	1^0
48	M	Sarcoma dorsum (rt)	WLE+LDMF	1^0
33	F	Sarcoma dorsum (rt)	WLE+LDMF	1^0
50	M	MFH dorsum right	WLE+LDMF	1^0
24	F	Chondrosarcoma 3^{rd}, 4^{th}, 5^{th}, 6^{th} ribs (lt)	Chest wall resection+reconstruction with LDMF	No scar
10	F	Ewing's sarcoma (lt)	WLE+chest reconstruction with mesh+LDMF	No scar
26	F	Recurrent anterior chest wall MFH	WLE+chest wall reconstruction with LDMF	1^0
27	F	Ca breast (lt)	BCS+LDMF	1^0
40	F	Ca breast (lt) TxNM0	BCS+LDMF	1^0
33	F	Ca breast (lt) T4a N1 Mx	BCS+LDMF	1^0
28	F	Ca breast (lt) post biopsy T0N1M0	BCS+LDMF	1^0
30	F	Ca breast post biopsy T0N1M0	BCS+LDMF	1^0
35	F	Ca breast T2N0M0	BCS+LDMF	1^0
28	F	Ca breast post biopsy TxN1M0	BCS+LDMF	1^0
45	F	Ca breast T2N0M0	BCS+LDMF	1^0
32	F	Ca breast T2N0M0	BCS+LDMF	1^0

WLE: Wide local excision, BCS: Breast conservation surgery, LDMF: Latissimus dorsi myocutaneous flap, Ca: Carcinoma, rt: Right, lt: Left, M: Male, F: Female, MFH: Malignant fibrous histiocytoma, SSG: Split skin graft

surgeries or patients who desired for conception, were offered the dorsal donor site. In cases of carcinoma breast, LDMF was used as primary procedure for reconstruction. Out of nine cases of breast reconstruction; five patients required LDMF due to previous surgery done outside for which required skin and volume replacement was needed, while in four cases required only volume replacement due to small to moderate size breast lesions. In all these cases, standard LDMF with a superior posterior skin island based on the dominant pedicle was harvested. In 89% (16/18) of patients, the serratus branch was ligated to increase the arc of LDMF. The thoracodorsal vascular branch to the serratus muscle was divided to increase the flap rotation as shown by Yang *et al*.[8]

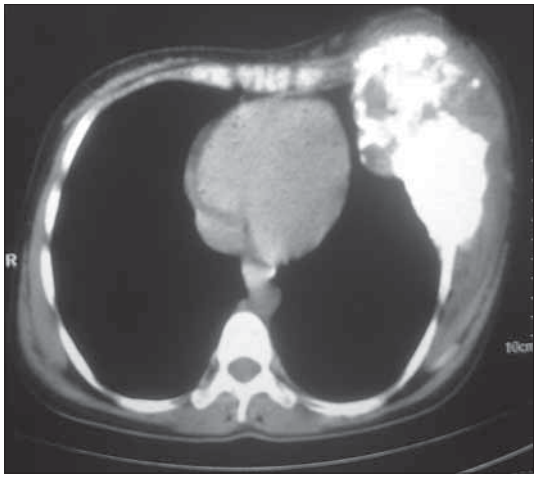

Figure 1: Computed tomogram scan showing the chest wall tumor invading bone

RESULTS

Out of 18 patients, two patients in this series of breast cancers were unmarried. Tumor size of the all the breast lesions ranged from 3.5 to 5 cm, and other soft tissue and bone lesions were up to 18 cm in maximum dimension. In the tumor location of the breast, 80% were in upper quadrant and 20% were in the inner quadrant. Out of three cases of soft tissue and bone sarcomas, one patient was of chondrosarcoma on the left chest wall [Figure 1], who required large chest wall resection where more than three ribs were resected. In the other two cases of chest wall lesions LDMF flap was used for coverage of bilayered prolene mesh and due to skin loss for cutaneous margin.

In our series, in 13 patients the flap had healed primarily without flap congestion, margin necrosis, or infection. The following minor postoperative complications were observed, like wound infection with skin necrosis in one patient (5.5%) and seroma formation. Seroma formation was seen at both the donor site and at the defect site in four patients (22%) [Table 2]. In the patient with partial necrosis of the flap was managed with wound debridement and split skin graft. Out of nine patients, in eight patients of carcinoma breast the histology was infiltrating duct carcinoma and in one case it was a lobular carcinoma.

All the patients received postoperative radiotherapy and in the cases of carcinoma breast the patients received both chemotherapy and radiotherapy. Postoperative therapy was started between 3 and 4 weeks. The donor site was closed primarily in 17 cases and one case required split thickness graft. Follow-up after 24 months showed the contour of flap was esthetically acceptable and the functions of upper limb excellent.

DISCUSSION

In this series we have employed LDMF for immediate reconstruction of surgical defects. Our experience with

LDMF in 18 cases ranges from various procedures like conservative breast surgery, chest wall defects, and post-resection defects of the dorsum.

Experience of LDMF in breast surgery is well-known, but the use of LDMF in chest wall reconstruction and dorsal defects has been reexplored in our series. The pedicled LDMF can be used as a myocutaneous flap or it can be raised as a simple muscle flap only [Figure 2]. The transverse rectus abdominis muscle flap (TRAM) has emerged as the preferred flap for reconstruction of the breast after mastectomy. In spite of the availability of TRAM, LDMF remains as an alternative for patients who had previously undergone breast surgeries, abdominal surgeries, and in unmarried females. This assumes significance in the light of the importance of breast reconstruction in the rehabilitation of breast cancer patients after surgery. In oncoplastic breast surgery, reconstruction can be offered to patients with large breast tumor, in small to medium sized breasts, with a previous biopsy scar, and reconstruction by LDMF results in good postoperative cosmesis.[9,10] The primary location of the tumor is an important factor in selecting the appropriate oncoplastic procedure. The LDMF is commonly used for lateral and central defects, and sometimes even in medial

Table 2: The different complications commonly encountered following=latissimus dorsi myocutaneous flap reconstruction viz-à-viz our series

Type of complications	No. of patients (18)
General complications	
Hematoma	0
Wound infection	1
Flap complications	
Skin necrosis	1
Fat necrosis	0
Donor site morbidity	
Seroma	4
Scarring	0
Back pain	0

Figure 2: Picture showing the latissimus dorsi myocutaneous flap as muscle flap only

defects.[8] In our series 5/9 (55.5%) cases had upper quadrant defects, 3/9 (33.3%) had lateral defects, and 1/9 (11.1%) patients had inferior quadrant defects. The disadvantages of LDMF for breast reconstruction are, its long operative time compared to local flaps, shoulder restriction and seroma formation, however in our series we had no flap failure, there was minimum morbidity to the patients following the surgery, and postoperative seroma formation was seen in 22% of the patients. The operative time was approximately 120 min in all the cases. It has also been found to have a wide usage in coverage of soft tissue defects in the chest and back due to the large volume of tissue available for reconstruction. Reconstruction with bilayered prolene mesh with methylmethacrylate is useful to provide additional stability and to prevent paradoxical movements in the defect.[11] In our series, in one patient, reconstruction with prolene mesh with methylmethacrylate was used.

The long vascular pedicle offers excellent range for pedicled flaps and minimal donor site morbidity.[4] Because of good skin coverage and adequate oncological margins, postoperative external beam radiation can be started after 3 weeks, which results in good locoregional control. The rate of skin flap necrosis along with wound infection was seen in 5% of all the patients in comparison with the series of Abdalla *et al*., who reported skin flap necrosis in 12% patients and wound infection in 4%.[12] LDMF and TRAM flap has good esthetic outcome, but TRAM flap has a higher rate of both overall complications and significant complications like hernias, fat necrosis, etc.[13-16] Kachoo *et al*. in their series of patients had done pedicled myocutaneous flap to cover chest wall defects in 75% of cases;[17] however, in this series in all the patients with soft tissue sarcoma and bone sarcomas, the full thickness defect was repaired with LDMF. In the chest wall defects out of three cases, two cases required full thickness chest wall reconstruction due to skin involvement. The choice of the reconstruction depends on the location and the size of the defect, availability of local and pedicled options, previous operations, radiotherapy, and the general condition of the patient.[18-21]

LDMF is an easy to elevate flap with a wide arc of rotation and can be tailored to large defects in the anterior third, lateral two-thirds, and posterior regions of the chest.[9] In our series, all chest wall tumors occurred in unmarried females with large defects and so LDMF was the best option available other than free flaps. In comparison to vertical rectus abdominis myocutaneous flap (VRAM), TRAM is used to cover epigastric and sternal area and anterolateral chest defects. Microvascular free flaps remains as an option if there is a local flap failure, but it is unreliable due to scars or radiotherapy or in complex thoracoabdominal large defects.[22-24] In cases with reconstruction by mesh along with myocutaneous flap, the postoperative recovery is significantly better.[25]

In extensive resections without compromising the cosmetic outcome and in situations when there is need for prosthesis or contralateral surgery, volume replacement has been advocated.[26] LDMF can be used in these circumstances as done in our series. Early postoperative adjuvant therapy can be started in this series of patients because of good coverage of the defect. In our series the chest wall defects were due to tumor resection, but the defects in the chest wall may also result from postradiation necrosis and trauma and thus necessitating the need for reconstruction with the bulk of LDMF. Reconstruction of defects of the chest wall is primarily required for coverage of vital organs and also to allow early recovery for starting postoperative adjuvant oncological therapy.

CONCLUSION

LDMF should be utilized more often, as it is technically straightforward procedure with minimal complications that provides coverage of varied defects involving breast, chest wall, and back and acceptable cosmetic outcomes.

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