

# Surgical Options for covering soft tissue defects in locally advanced and recurrent Breast Cancer

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**Abstract :** Radical surgical extirpation in locally advanced and recurrent breast cancer produces extensive loss of skin and soft tissues of the chest wall with resultant large defects and the primary aim in these groups of patients is to replace skin rather than to replace breast tissues. Skin grafts were one of the initial methods used but poor cosmesis, infection and post radiation problems prompted development of newer surgical options. Lattisimus dorsi myocutaneous flap was one of the first flaps to be described, using the lattisimus dorsi muscle based on thoracodorsal artery; but was not the ideal option in large defects. Thereafter, the techniques of Transverse Rectus Abdominis myocutaneous flaps, based on the Rectus abdominis muscles were developed. Multiple techniques of Transverse Rectus Abdominis myocutaneous flaps were developed and used depending on the given operative situation.

**Keywords :** *Locally advanced treatment breast cancer, myocutaneous flaps, omental transposition.*

## Introduction :

Globally Breast cancer is one of the commonest malignancies encountered in woman and is a leading cause of death from cancer in females<sup>1</sup>. In the developing world, it may account for 300,000 cases and 150,000 deaths annually<sup>2</sup>. Locally advanced and Recurrent Breast cancer comprise 10%-25% of all breast cancer in developed countries and 40% -50% in developing countries<sup>1</sup>. Radical surgical extirpation in these patients produces extensive loss of skin and soft tissues of the chest wall with resultant large defects that may not be suitable for primary closure. In addition, resections for recurrent breast cancer and post radiation ulcers also result in extensive skin loss with or without chest wall defects. Several methods have been tried during the last four decades including skin grafts, local flaps, omental flaps, abdominal flaps and myocutaneous flaps to cover soft tissue defects following surgery for LABC and recurrent breast cancer. Recently deo et al<sup>3,4</sup> have published their experience of Thoraco abdominal flap for managing such defects efficiently. The aim of reconstruction in this group of patients should be an expeditious and simple closure with good quality skin cover so that they can receive early post operative radiation with minimal morbidity. There is no clear consensus on the method of repair to be adopted in such cases.

## Review of Literature :

In the developing world almost half of all patients of breast cancer presents with locally advanced disease<sup>1</sup> where lack of resources and expertise often determine the kind of therapy to be offered and logistic considerations override aesthetic options. The primary aim following mastectomy in such patients is to replace lost breast skin rather than to replace breast tissue. Until skin grafting became available radical mastectomies were all allowed to heal by secondary epithelialisation<sup>5</sup>. Skin grafts were developed in 1920s but was available in only few centres and it was utilised for post mastectomy cover in the 50's, when radical mastectomy was the treatment of choice<sup>6</sup>. But it is unattractive and less durable, needs extended period of time for recipient and donor site healing. Also, poor cosmesis, infection and an increased late loss following radiation led to the development of other surgical options. Further developments in the field of myocutaneous flaps as well as free tissue transfer have led to a paradigm shift in the reconstructive options available to the surgeon and split thickness skin grafts have almost totally been replaced by other alternatives<sup>7</sup>.

The primary objective of reconstruction of the post –mastectomy defect after removal of locally advanced disease is to provide durable full-thickness skin cover with quick wound healing and minimal perioperative morbidity to enable rapid administration of regional radiotherapy and systemic chemotherapy<sup>8</sup>.

Functional and aesthetic reconstruction has also been used for locally advanced breast cancer in selected centers<sup>9</sup>. However, the guarded prognosis of patients with locally advanced breast cancer and lack of resources and expertise limits the use of complex reconstructive options in many of these cases. Myocutaneous flaps such as the lattisimus dorsi flap and the rectus abdominis flap (RAMF) provide excellent results<sup>7,10</sup>. The lattisimus dorsi myocutaneous flap (LD) was first described by Ignio Tansini, Professor of Surgery at University of Pavia in Italy in 1896. He utilised it to cover post mastectomy defects in the early part of the 20th century<sup>11</sup>. The purpose of the flap was to replace the pectoralis major muscle and skin following radical mastectomy utilising tissue from the back to cover the defect. However between 1920-1974 this procedure was completely abandoned as Halstead thought this to be unnecessary and hazardous<sup>12</sup>. This was reintroduced in 1975 for cover as well as for reconstruction<sup>13</sup>. From 1977 to 1982 LD myocutaneous flap was the standard against which all other method of reconstruction was measured<sup>14</sup>. This flap utilises skin paddle based on lattisimus dorsi muscle supplied by thoracodorsal artery and branches of posterior intercostal arteries. Its advantages are reliable blood supply and lack of donor site morbidity. Because of excellent blood supply it is rarely lost and can be used in conditions where rectus abdominis myocutaneous flap is not suitable such as obesity, diabetes mellitus and smoking. Its main disadvantage are limited size of donor skin that does not stretch well. Muscle utilised can be wide but if more than 8 to 10 cms skin is mobilised then primary closure of donor site can't be achieved. Hence, it may not always be adequate for large wounds following mastectomy for LABC.

Beginning in 1982 was the era of Hartramp's TRAM flap (15). By 1985 LD flap was replaced by the TRAM flap. Rectus abdominis (RA) muscle can be utilised to raise large flaps (10). *Four different versions* can be used (a) Vertical rectus abdominis flap (VRAM); (b) Single pedicle TRAM; (c) Double pedicle TRAM; (d) Free TRAM<sup>3</sup>.

VRAM is the earliest to be described and easiest technically. Skin paddle is positioned vertically over contralateral RA muscle. It has got abundant blood supply and because of lax abdominal skin in woman large amount of skin can be mobilised and donor site closed primarily and hence suitable for large defects. Single

pedicle TRAM utilises transeversely oriented skin paddle, but has got less blood supply and depends on small number of perforating vessels. Moreover, circulation may be inadequate in smokers, diabetes mellitus and presence of abdominal scar. Double pedicle TRAM is a variation based on both RA muscle that avoids the blood supply problem and flaps can be made large. It helps in cover and forms a mound as well. Free tissue transfer has also been described for cover. In 1990s microvascular TRAM expanded the indication for cover and reconstruction<sup>16,17</sup>. Free TRAM is based on deep inferior epigastric artery and is associated with fewer complications and revisions. It can be used in high risk patients. However, it requires highly specialised equipments and well trained personnel.

*Omental transposition flap* and *split skin graft* has also been utilised for large fungating and discharging lesions encountered in LABC<sup>18</sup>. It helps in local control and relief of symptoms<sup>19</sup>. Many reports of Omental transposition and skin grafting for coverage of post mastectomy defects are available in literature. Lee et al<sup>18</sup> have reported a success rate of 76% and abdominal herniation of 8% in 50 patients undergoing omental transposition for advanced breast cancer. Williams et al<sup>19</sup> in a series of 43 recurrent and advanced breast cancer patients undergoing omental transposition reported 23% partial omental necrosis, and 14% incisional hernia rate. Basically omentum provides a healthy bed for skin grafting<sup>18</sup>. The major drawbacks are a laparotomy procedure and a split skin graft.

Another interesting and grossly underutilized option is a *thoracoepigastric or thoracoabdominal fasciocutaneous flap*. The thoraco-abdominal (TA) flap was described by Brown et al in 1975<sup>20</sup>. It has been used for breast reconstruction along with a prosthesis and as a soft tissue cover following surgery for locally advanced breast cancer in some studies during late 70s and early 80s<sup>20,21,22</sup>. However with the advent of Myocutaneous flaps in 80s TA flap usage has declined significantly. This flap utilises the skin and subcutaneous tissue of the anterior abdominal wall and is a rotation advancement random pattern fasciocutaneous flap based on direct circumferential branches arising from the aorta forming the subcoastal and lumbar arteries. They give off two main perforating branches- the *lateral* at the level of the anterior border of the latissimus dorsi and the *medial* at the level of the lateral border of the rectus abdominis. There is presence of subfascial anastomosis between the anterior and lateral perforators that may also receive a contribution from the perforating branches of the deep superior and inferior epigastric arteries. For post mastectomy defects on the lateral side of the chest wall (and axilla), a medially based flap based on the anterior perforating branches of the intercostal arteries can be used where as for medial soft tissue defects (upto the clavicle), a laterally based flap based on the lateral perforators of the intercostal arteries offers a better reconstructive option. The limits of the flap extend from the midline medially to the anterior axillary line laterally, Inframammary crease superiorly to a horizontal plane at the level of anterior superior iliac spine inferiorly. The operative technique of TS flap is described in detail by deo et al<sup>3</sup>. In a recent study by deo et al<sup>4</sup> from a tertiary care center in north india the superiority of TA flap over myocutaneous flaps for covering soft tissue defects in LABC was clearly demonstrated in terms of simplicity of procedure, operative time, blood loss and wound morbidity.

### Conclusions :

Locally advanced breast cancer is a problem of developing countries like India. Radical surgical resection in such patients results in major soft tissue defects not amenable for primary closure, hence surgery - the most effective locoregional modality for controlling breast cancer is denied in majority of patients.

Various techniques are available for managing such defects. Skin grafting and omental flaps have major limitations and expertise for complex reconstructive procedures using myocutaneous flaps is not widely available in developing countries. The basic aim in such patients is to achieve a healthy and simple skin cover expeditiously so that patients can receive adjuvant chemo and radiotherapy in time. Thoraco abdominal flap seems to be a very attractive option in such patients because of its simplicity and reliability.

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