# Rectus Abdominis Myocutaneous Flap in Cancer Surgery: A Versatile Flap for Wound Coverage Around the Trunk

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**Abstract**

Rectus abdominis myocutaneous flap (RAMF) was used to cover the wide defect created after excisional surgery of 42 patients of carcinoma breast, 6 of penile cancer with inguinal metastasis and 2 of carcinoma anal canal and 2 of sarcoma chest wall. Complications of RAMF included cuticular necrosis, wound infection, seroma formation, flap edema which was managed conservatively or by minor surgical procedures.

## INTRODUCTION

The rectus abdominis myocutaneous flap (RAMF), first described by Mathes and Bostwick to re-construct defects of the abdominal wall ([1]), has become a workhorse in reconstructive plastic surgery. As a bipedicled flap based superiorly on the superior epigastric vessels, it is used for breast and chest wall reconstruction and based inferiorly on the inferior epigastric vessels, it has been used for reconstruction of groin defects, vulval, perineal and vaginoperineal defects ([2,3,4]). So this flap has the versatility of being used from the trunk to the groin area. RAMF can be used both for covering the wide defect and also for the cosmetic reason ([5,6]). We review our experience with rectus abdominis myocutaneous flap for coverage of the wide defect after cancer surgery.

## PATIENTS AND METHODS

Fifty two patients underwent RAMF coverage in one surgical unit. Forty two patients of locally advanced breast carcinoma underwent neoadjuvant chemotherapy followed by mastectomy leaving a large defect on the chest wall( Figure 1). The flap was used to cover the chest wall defect, in two patients following excision of sarcoma of chest wall.

**Figure 1**

Figure 1: Rectus abdominis flap after mastectomy for fungating carcinoma breast.

Six patients of invasive penile cancer with unilateral fungating inguinal metastases were treated by penectomy

and inguinal block dissection with excision of skin. RAMF was used for coverage of the wide skin defect (Figure 2). In two case of advanced carcinoma of anal canal, abdominoperineal resection with wide excision of the skin was performed and raw area in perineum was covered with RAMF.

### Figure 2

Figure 2: Rectus abdominis flap after inguinal block dissection for fungating lymphadenopthy

Technique used was similar as described by previous authors ([2,3,4]). In 40 cases vertical rectus abdominis myocutaneous flap and in 12 cases transverse rectus abdominis myocutaneous (TRAM) flap was used. Flap based on ipsilateral (42patients) or contra lateral (10 patients) rectus muscle (depending upon the pre-existing scars) was vertically or transversely oriented with appropriate length and width. The biggest size of the flap was 20 cm 12cm size. The perforators supplying the abdominal skin paddle were preserved by including a small cuff of anterior rectus sheath fascia along with the muscle. The defect in the anterior rectus sheath was closed directly by far and near tension suture technique.

## RESULTS

Various complications in relation to flap and donor site are listed in Table 1. Complete loss of flap occurred in one patient due to twist in the pedicle during surgery which happened in the second case of this study. Partial loss was seen in 3 patients. Cuticular necrosis was seen in 8 patients in which skin get peeled off and epithelialized within few days. Wound infection was present at flap site and donor site in 9 and 4 patients respectively. All patients received perioperative antibiotic prophylaxis with either ampicillin/clavulanic acid or cephalosporin. Seroma was present in 7 patients. Flap edema was seen in 6 patients. Two patients complained of lower abdominal discomfort and pain at donor site lasting longer than 6 months. None of our patients developed incisional hernia in the mean follow up of 4.1 years.

### Figure 3

Table 1: Complications of rectus flap (n=52)

| **Flap Site** | | **Donor Site** | |
|---|---|---|---|
| Complications | No. of patients | Complications | No. of patients |
| Complete flap loss | 1 | Infection | 4 |
| Partial flap loss | 3 | Haematoma | 4 |
| Cuticular necrosis | 8 | Wound dehiscence | 0 |
| Haematoma | 4 | Delayed healing | 4 |
| Infection | 9 | Incisional hernia | 0 |
| Seroma | 8 | | |
| Flap edema | 8 | | |

Post operative chemotherapy was given to all patients of breast carcinoma and the chest wall sarcoma. The patients of carcinoma penis and anal canal carcinoma were subjected to radiotherapy and chemotherapy.

## DISCUSSION

Rectus abdominis myocutaneous flap has been widely used in breast cancer either for post mastectomy reconstruction of breast mound for cosmesis and may also be used to provide skin cover for large chest wall defects created by palliative or salvage mastectomy ([7]). Reconstruction may be performed as an immediate procedure or after an interval following mastectomy ([8]). Patients with previous radiation therapy characterized by radiation induced fibrosis of soft tissue and vasculature are ideal for rectus flap reconstruction ([9]). RAMF provide a good volume of tissue and also the bulk.

Initially for breast defects, flaps based on either the contra lateral or ipsilateral muscle were selected. As ipsilateral flap gives the better shape of the breast and also provides tissue for constructing the tail of the breast, it is preferred over contra lateral flap. Another advantage of the ipsilateral flap is that it lessens the bulge on the pedicle in the perixiphoid region ([10]). Risk factors have been identified which must be considered in pre-operative planning of this flap. Obesity especially when the patient weighs over 25% more than the ideal body weight, diabetes, autoimmune disease, abdominal scars are the various risk factors ([8]). Surgeon's experience is also equally valid.

Inguinal block dissection is associated with significant morbidity including phlebitis, pulmonary embolism, wound infection, flap necrosis and lymphedema. Poor wound healing may be because of interruption of the cutaneous blood supply during dissection, creation of large dead space in groin and closure of wound under tension. In the large defect created in patient undergoing inguinal lymph node dissection with fungative nodes, the inferior based rectus abdominis myocutaneous flap can be safely used to cover this defect ([2,3]).The contra lateral muscle is used most often because the ipsilateral epigastric vessel may be divided as part of dissection side. The muscle is harvested through the extended midline or paramedian incision following inguinal lymphadenectomy. This flap can not be used in cases of bilateral groin involvement.

Large perineal wound following abdominoperineal excision in carcinoma of the anal canal may leave a defect which may take many months to heal. Rapid healing is desirable in these patients as post-operative radiotherapy is needed. The use of inferiorly based rectus abdominis myocutaneousflap for such defect allows early radiotherapy which is well tolerated by the patient. Where radical surgery is required following radiotherapy, the flap will alleviate the problems of poor healing of irradiated tissue ([4,11]).

Rectus abdominis myocutaneous flap is associated with several complications and well planned surgery in a suitable patient by an experienced surgeon reduces the complication. The advantage of the rectus abdominis flap lies in the bulk of the tissue which not only allow for early healing but also help in the post operative radiation. The technique of near and far suture for suturing the rectus sheath defect of the abdomen is a technique well described for the repair of incisional hernia. The advantage of this technique is that the tension falls on the peripheral part than that of the central part so that the two edges can be approximated easily. Because of this technique we never used mesh for the closure of the abdominal defect which has been a standard technique described by many authors. Mesh is expensive and it is associated with its own complication.

In conclusion, rectus abdominis myocutaneous flap is a versatile flap and as it is biaxial so it can be rotated in almost all directions. The technique of raising this flap is comparatively easier and can be learnt by any surgeon with little experience.

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## References

1. Mathes SJ, Bostwick J. A rectus abdominis myocutaneous flap to reconstruct abdominal wall defects, Br. J. Plast Surg. 1977; 30: 282-3.
2. Aygit AC, Onat R, Aydin Y, Orak F. Contralateral rectus abdominis muscle flap coverage for the management of a complicated groin defect. Ann. Plast Surg. 1997; 38; 307-8
3. Bare RL, Assimos DG, Mc Cullough DL, Smith DP, De Franzo AJ, Marks MW. Inguinal lymphadenectomy and primary groin reconstruction using rectus abdominis muscle flaps in patients with penile cancer. Urology, 1994; 44: 557-61.
4. Erdmann MW, Waterhouse M. The transpelvic rectus abdominis flap: its use in the reconstruction of extensive perineal defects. Ann. R. Coll. Surg. Engl. 1995; 77: 229-32.
5. Spear SL, Wolfe AJ. The coincidence of TRAM Flap and prostheses in the setting of breast reconstruction. Plast. Reconstr. Surg 2002; 110:478-86
6. Lipa JE, Youssef AA, Kuerer HM, Robb GL, Chang DW. Breast reconstruction in older women: advantages of autogenous tissue. Plast. Reconstr. Surg 2003; 111: 1110-1120.
7. Rietjens M. De Lorenzi F, Veronesi P, Youssef O, Petit JY. Recycling spare tissues: splitting a bipedicled TRAM flap for reconstruction of the contralateral breast. Br J Plast Surg. 2003; 56:715-7.
8. Elliott LF, Hartrampf CR Jr. Breast reconstruction: progress in the past decade. World J. Surg. 1990; 14; 763-775.
9. Shrotria S, Webster DJ, Mansel RE, Hughes LE. Complications of rectus abdominis myocutaneous flap in breast surgery Eur J. Surg. Oncol 1993; 19: 80-83.
10. Slavin SA, Goldwyn RM. The mid abdominal rectus abdominis myocutaneous flap : Review of 236 flaps. Plast Reconstr. Surg. 1988; 81: 189-199.
11. de Hass WG, Miller MJ, Temple WJ, Kroll SS, Schusterman MA, Reece GP, Skibber JM. Perineal wound closure with the rectus abdominis musculocutaneous flap after tumour ablation. Ann Surg. Oncol 1995; 2: 400-6.

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