

# Complications and Outcomes in Breast Reconstruction using A Transverse Rectus Abdominis Myocutaneous Flap-Single Surgeon Experience

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**Background:** Breast cancer is the most common cancer in Thai women. Current treatments of breast cancer aim not only at complete cure but also at maintaining the patients' quality of life. Mastectomy is still a standard procedure for removal of cancer, but nowadays the patient has many modalities to choose from in order to achieve cosmetic satisfaction. Breast reconstruction with transverse rectus abdominis myocutaneous (TRAM) flap is one of the options; however, it is a complicated procedure because of its resultant longer operative time, decrease in abdominal wall strength, and unpredictability of blood supply in some areas.

**Objective:** The aim of this study was to report the complications and outcomes of breast reconstruction with TRAM flap performed by a single surgeon in Rajavithi Hospital.

**Material and Method:** An observational retrospective study review was performed of all women who underwent breast reconstruction with TRAM flap after mastectomy between June 2012 and June 2013. A total of 20 patients were recruited of which one had ductal carcinoma in situ (DCIS), 7 had stage I cancers, 7 had stage II, 4 had stage III, and 1 had large phyllodes tumor. Details of operative time, immediate postoperative complications, length of hospital stay and time to return to work were recorded. The patients were asked to grade their satisfaction with the reconstruction procedure on a 5-point scale (5 points: extremely satisfied; 1 point: extremely dissatisfied) 3 months after surgery.

**Results:** The mean operative time was 4 hours and 45 minutes. Average follow-up time was 2 years. Postoperative complications occurred in 5 patients and included partial fat necrosis (n = 3), partial donor skin necrosis (n = 1), and partial umbilical necrosis (n = 1). There were no total flap losses or incisional hernias. Patients were able to be discharged at an average of 7.45 days and return to normal activities or work at an average of 5 weeks. Two patients developed metastasis, and in these patients the average interval between TRAM flap reconstruction and metastasis was 1 year. The average satisfaction grade was 4 points.

**Conclusion:** TRAM flap reconstruction after mastectomy is an appropriate way to improve the patient's postoperative physical appearance. The results of this study indicated that TRAM flap reconstruction after mastectomy is safe, with an acceptably low number of complications and can be performed by a single surgeon in conjunction with a mastectomy procedure; furthermore, the majority of patients were satisfied with their reconstructed breast.

**Keywords:** Immediate breast reconstruction, Transverse rectus abdominis myocutaneous flap (TRAM), Complications, Outcome

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Breast cancer is the most common cancer in Thai women<sup>(1)</sup>. Recent treatments of breast cancer aim not only to completely cure the patients, but also to maintain or enhance their quality of life. Mastectomy is still a standard procedure for removal of cancer, but nowadays, the patient has many choices of treatments

to conserve her physical appearance such as breast conservation therapy (BCT) and breast reconstruction. Whole breast reconstruction after mastectomy has been accepted as a safe procedure<sup>(2)</sup>, and transverse rectus abdominis myocutaneous (TRAM) flap is one of the best-known procedures for reconstruction of new breasts. The advantages of this procedure are its use of autologous tissue, which has no allergic or foreign body reaction, and its reasonable cost, as there is no payment for breast prosthesis. However, TRAM flap reconstruction still has some disadvantages, such as

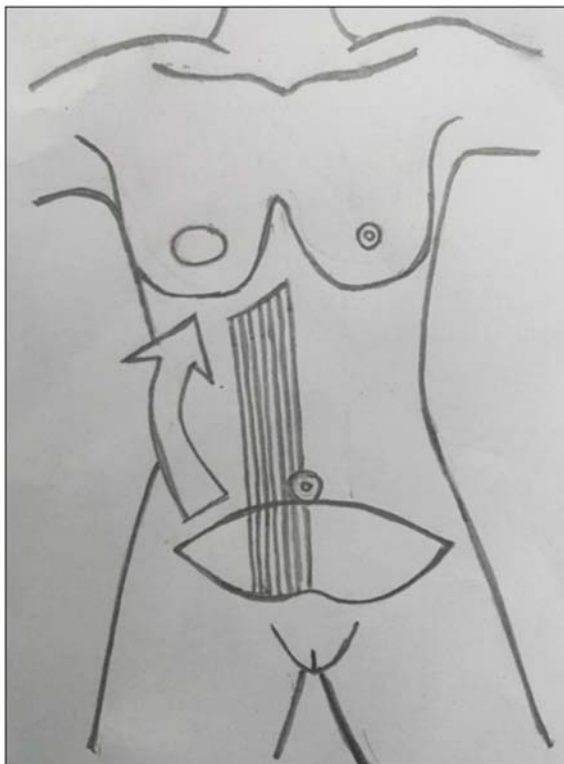
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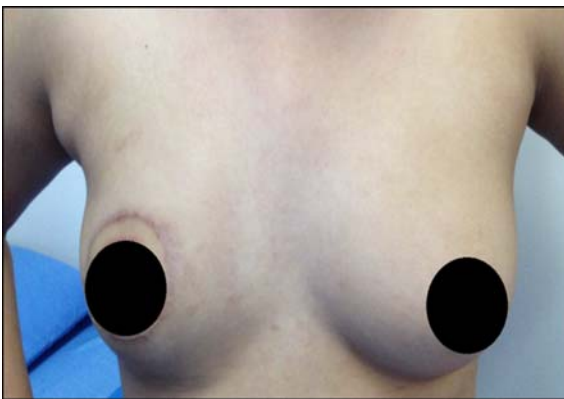
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**Fig. 1** TRAM flaps reconstruction procedure.



**Fig. 2** A 33 year-old-female underwent immediate TRAM flap reconstruction after total mastectomy with sentinel lymph node biopsy.

increased postoperative pain and resultant abdominal wall weakness. TRAM flap reconstruction has been used in Rajavithi Hospital since June 2012, but to date, there has been no report on its complications and outcomes. This study, therefore, is the first report to be conducted in Rajavithi Hospital about the complications, outcomes and satisfaction levels of

patients who underwent breast reconstruction with TRAM flap after mastectomy by a single surgeon.

### Material and Method

This study was reviewed and approved by the ethics committees of Rajavithi Hospital, Bangkok, Thailand (No. 28/2559). An observational retrospective review was performed of all women undergoing TRAM flap breast reconstruction after mastectomy between June 2012 and June 2013, and a total of 20 patients were recruited. Details were recorded of operative time, immediate postoperative complications, length of hospital stay and time to return to work. Follow-up data were collected through chart reviews in addition to patient and telephone interviews in which patients were asked about their time to recovery and when they were able to return to work. During telephone follow-up, patients were asked to grade their satisfaction on a 5-point scale 3 months after their operation (5 points being extremely satisfied and 1 point being extremely dissatisfied). All baseline characteristics were described as number and percentage, and calculations were performed with the Excel program.

### Operative techniques

All procedures on patients undergoing TRAM flap reconstruction after mastectomy were performed in a similar fashion. Skin sparing mastectomy and ipsilateral pedicle TRAM flap were performed, and the flaps were harvested with a sheath sparing technique. Due to the weakness of the rectus sheath, prolene meshes were placed on top of the sheaths of 5 patients. All patient activity was limited to bed rest in the first 2 days in Fowler's position, and nineteen patients were discharged from the hospital within 1 week. An outline of the procedure for TRAM flap reconstruction is shown in Fig. 1.

### Results

Over a 1-year period (June 2012 to June 2013) 20 women underwent TRAM flap reconstruction after mastectomy in Rajavithi Hospital. One patient had ductal carcinoma in situ (DCIS), 7 had stage I cancer, 7 had stage II, 4 had stage III and 1 patient had large phyllodes tumor. The mean patient age was 44 years (range 27 to 60 years). The extirpative procedure consisted of total mastectomy with sentinel lymph node biopsy in 11 cases, modified radical mastectomy in 8 cases, and total mastectomy for the one case of phyllodes tumor. Of 11 sentinel lymph node biopsies, 5 cases were positive for malignancy and axillary

dissection was subsequently performed. Of the 20 TRAM flaps, 18 were performed immediately and 2 underwent delayed reconstruction after complete adjuvant therapy. The majority of tumors were ductal carcinomas (Table 1).

After surgery, 5 patients underwent adjuvant therapy consisting of chemotherapy and radiation therapy, and 8 patients had chemotherapy alone. Two patients received neoadjuvant chemotherapy before their operation followed by adjuvant radiation. The remaining patients did not receive adjuvant chemotherapy or radiation after operation because two of them had delayed reconstruction, two had phyllodes tumor and 1 had DCIS. All patients with positive estrogen receptor of carcinoma were prescribed hormonal treatment for 5 years.

All patients had follow-up of at least 2 years. The mean operative time was 4 hours and 45 minutes. Postoperative complications occurred in 5 patients (25%) and included partial fat necrosis (n = 3), partial donor skin necrosis (n = 1), and partial umbilical necrosis (n = 1). All complications were rectified in either the office setting or with home care. There were no total flap losses or incisional hernias in this series. Patients were able to be discharged at an average of 7.45 days after their operation and to return to normal activities or work at an average of 5 weeks postoperatively (Table 2).

Two patients developed metastasis, one of the bone and another of the lung, and the average interval between TRAM flap reconstruction and metastasis was 1 year (bone metastasis at 6 months, lung metastasis at 18 months). There were neither ipsilateral nor contralateral breast recurrences. All patients underwent mammography and ultrasonography yearly after the operation.

All patients participated in the patient satisfaction survey (Table 3). They were asked for the 5-point satisfaction scale 3 months after the operation, and the average satisfaction grade was 4.0 points. None of the patients answering the survey was dissatisfied with their experience or results.

## Discussion

Breast cancer is the most common cancer in Thai women<sup>(1)</sup>, and its incidence is increasing every year. The prevalence of breast cancer in Thailand is about 33 per 100,000 population<sup>(1)</sup>. Even though surgery is the major treatment for breast cancer, nowadays we have to take into account both complete cancer cure and maintenance of the patients' quality of life.

**Table 1.** Tumor Pathology and staging (n = 20)

Pathology	n (%)
Ductal carcinoma in situ	1 (5.0)
Invasive ductal carcinoma stage I	7 (35.0)
Invasive ductal carcinoma stage II	7 (35.0)
Invasive ductal carcinoma stage III	4 (20.0)
Large Phyllodes tumor	1 (5.0)

**Table 2.** Hospital stay (days)

Hospital stay (days)	n
5 days	1
6 days	2
7 days	16
20 days	1
Mean	7.45 days
Median	6.50 days

**Table 3.** Results of patient survey (response rate at 3 months) (n = 20)

Satisfaction grade	n (%)
5 (extremely satisfied)	7 (35.0)
4 (very satisfied)	7 (35.0)
3 (satisfied)	5 (25.0)
2 (not satisfied)	1 (5.0)
1 (extremely dissatisfied)	0 (0.0)
Average grade, point	4.0/5.0

Mastectomy is still the standard procedure for breast cancer patients who have contraindication for breast conservation therapy, but this procedure significantly affects the patient's physical appearance and self-confidence; therefore, breast reconstruction procedures are options for those concerned with cosmetic satisfaction.

Pedicle TRAM flap is a procedure used worldwide for mastectomy reconstruction, but in the past, this procedure was performed by plastic surgeons after mastectomy. Recently, there are increasing numbers of breast surgeons who can perform both mastectomy and TRAM flap reconstruction without the assistance of another surgeon. The important parameters that have been used to assess the effectiveness of TRAM flap reconstruction are complications, operative time, length of hospital stay,

time to return to work and patient satisfaction<sup>(3)</sup>. In previous studies, the operative times were found to be 4.46 hours<sup>(4)</sup>, length of hospital stay was 6-7 days<sup>(5)</sup> and time of postoperative recovery to return to preoperative physical functioning was 2-4 months<sup>(6)</sup>. In this study, the average operative time (including mastectomy times) was 4 hours 45 minutes, which was similar to that of the previous study. The mean length of hospital stay was a little longer than the previous study (7.45 days), and this may be due to the time required to remove drains; in all cases in this study, we waited until the volume of drain was less than 30 cc. One patient had donor skin flap necrosis because her skin had poor vascular supply due to history of chest wall burn when she was young, and she was discharged from the hospital after 20 days. The mean time to return to work was 5 weeks, shorter than in a previous study<sup>(6)</sup>, and this may be the result of early ambulation after surgery. All patients were advised to bed rest after surgery for the first day; they were allowed to walk around the bed on the second day; and on the third day they were allowed to perform most activities of their normal daily routine. However, the patients were advised to avoid hard exercise until the surgical wounds were sufficiently healed, which takes at least a few months. In a previous study, the incidence of abdominal laxity, bulge or hernia was 3-8 percent<sup>(7,8)</sup>, but in this study, these complications were not detected, and this may have been because the time to follow-up in this study was too short (2 years).

The major complications of TRAM flap reconstruction occur only rarely and include total flap loss in about 1 percent of cases or less<sup>(7)</sup>; this event necessitates surgery to remove necrotic tissue followed by an additional procedure to reconstruct the breast. In this study, there was no total flap loss. Partial fat necrosis was found in 15 percent of cases, and all of these patients were able to be treated non-operatively. Other serious potential complications such as bleeding, infection, deep vein thrombosis or pulmonary embolism did not occur. Another parameter that has been used to evaluate breast reconstruction is patient satisfaction, and in a previous study, the TRAM flap reconstruction was at a satisfactory level<sup>(9)</sup>. In this study, the average satisfaction score was 4/5 points, and all patients declared that they would choose TRAM flap again if cancer of the other breast occurred.

### Conclusion

TRAM flap reconstruction after mastectomy is an appropriate method for improving the patient's

physical appearance. The results of this study indicated that TRAM flap reconstruction after mastectomy is safe, with low numbers of complications, and that it is feasible to be performed by a single surgeon in conjunction with the mastectomy procedure. Furthermore, the majority of patients were very satisfied with their reconstructed breast.

### What is already known on this topic?

Transverse rectus abdominis myocutaneous (TRAM) flap is a safe and appropriate way to improve the patient's physical appearance with an acceptably low level of complications.

### What this study adds?

1) Breast reconstruction with transverse rectus abdominis myocutaneous (TRAM) flap can be performed by a single surgeon together with mastectomy in the same operation with no difference in complications or outcomes.

2) Thai patients who underwent this operation were able to return to work earlier than patients in other studies<sup>(6)</sup>.

### Acknowledgements

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### Potential conflicts of interest

None.

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ศึกษาผลภาวะแทรกซ้อนและผลการรักษาจากการทำการผ่าตัดเพื่อเสริมสร้างเต้านมโดยใช้กล้ามเนื้อและชั้นไขมันบริเวณหน้าท้องในผู้ป่วยมะเร็งเต้านม

พุทธิพร เย็นบุตร, ฉัตรนภา ศรีศิริพันธ์

ภูมิหลัง: การผ่าตัดเสริมสร้างเต้านมใหม่โดยใช้กล้ามเนื้อหน้าท้องแม้ว่าจะสามารถรักษาภาวะแทรกซ้อนที่ถึงของผู้ป่วยได้ก็จริง แต่ก็ทำให้เกิดภาวะแทรกซ้อนบางอย่างได้ เช่น เนื้อเยื่อที่โยกมาตาย ผิวหนังตาย ผิวหนังบริเวณสะดือตาย และใส่เลื่อนผนังหน้าท้อง

วัตถุประสงค์: ศึกษาภาวะแทรกซ้อนในระยะสั้น ตลอดจนผลการรักษา ซึ่งประกอบด้วยระยะเวลาในการผ่าตัด ระยะเวลาในการนอนโรงพยาบาล ระยะเวลาในการกลับไปทำงานปกติ และความพึงพอใจของผู้ป่วยหลังได้รับการผ่าตัดด้วยวิธีการเสริมสร้างเต้านมใหม่โดยใช้กล้ามเนื้อหน้าท้อง

วัสดุและวิธีการ: รวบรวมผู้ป่วยที่ได้รับการผ่าตัดเสริมสร้างเต้านมใหม่โดยใช้กล้ามเนื้อหน้าท้องจำนวน 20 ราย ตั้งแต่เดือนมิถุนายน พ.ศ. 2555 ถึงเดือนมิถุนายน พ.ศ. 2556 และติดตามอย่างน้อย 2 ปีหลังการผ่าตัด โดยติดตามและรวบรวมข้อมูลในเรื่องของภาวะแทรกซ้อน ระยะเวลาในการผ่าตัด ระยะเวลาในการนอนโรงพยาบาล ระยะเวลาในการกลับไปทำงานปกติ ผลพยาธิวิทยาสุดท้ายหลังการผ่าตัด และความพึงพอใจของผู้ป่วยหลังการผ่าตัด

ผลการศึกษา: ระยะเวลาในการผ่าตัดโดยเฉลี่ย คือ 4 ชั่วโมง 45 นาที ภาวะแทรกซ้อนในการผ่าตัดที่เกิดขึ้นทั้งหมด 5 ราย เป็นภาวะแทรกซ้อนที่ไม่ร้ายแรง ได้แก่ ชั้นไขมันของเนื้อเยื่อที่โยกมาตายบางส่วน 3 ราย (โดยทั้ง 3 รายไม่เสียรูปร่างของเต้านมและไม่ต้องผ่าตัดซ้ำ) ผิวหนังของส่วนเต้านมที่เหลือนอยู่ตายบางส่วน 1 ราย ผิวหนังของสะดือตายบางส่วน 1 ราย ในการศึกษานี้ไม่พบภาวะเนื้อเยื่อที่โยกมาตายทั้งหมด และไม่พบภาวะใส่เลื่อนผนังหน้าท้อง หลังติดตามการรักษาแล้ว 2 ปี ระยะเวลาในการนอนโรงพยาบาลโดยเฉลี่ยประมาณ 7.45 วัน และสามารถกลับไปทำงานตามปกติได้ภายใน 5 สัปดาห์ ผู้ป่วยทั้งหมดให้คะแนนความพึงพอใจหลังการผ่าตัดโดยเฉลี่ยอยู่ที่ 4 จาก 5 คะแนน

สรุป: การผ่าตัดเสริมสร้างเต้านมใหม่โดยใช้กล้ามเนื้อและชั้นไขมันบริเวณหน้าท้อง เป็นวิธีการที่เหมาะสมที่สามารถรักษาภาวะแทรกซ้อนที่ถึงของผู้ป่วยไว้ได้อย่างปลอดภัย โดยเป็นการผ่าตัดที่ภาวะแทรกซ้อนไม่มาก สามารถทำผ่าตัดโดยศัลยแพทย์คนเดียวร่วมกับที่ทำการตัดเต้านมพร้อมกับเสริมสร้างเต้านมใหม่ในครั้งเดียวกัน และผู้ป่วยส่วนใหญ่ก็ได้รับความพึงพอใจค่อนข้างมากจากการผ่าตัดชนิดนี้