

# TRAM Flap Breast Reconstruction is A Reliable Surgery For Early Breast Cancer

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## Abstract

Finding the clinical factors that were affected by the outcomes of breast reconstruction with Transverse Rectus Abdominis Myocutaneous Flap (TRAM) in early breast cancer patients. The pedicle TRAM flap breast reconstruction was performed in 41 patients after nipple-sparing mastectomy as well as modified radical mastectomy from 2017-2019 at Hue Central Hospital. Immediate breast reconstruction was in 14/41 cases, the ipsilateral pedicled TRAM flap was used in 11/41 cases. There is 95.1% of patients with BMI<25, more than 50% have abdominal scars, 61% of patients with operating time is 180 min-210 min, 85.4% spending in post operating period during 10 days-15 days. The rate of complication was 14.6%, with no finding the severe complications of reconstruction in the total flap necrosis and hernia or bulge in this study. The pedicled TRAM flap was a safe and reliable procedure for choosing breast reconstruction in Vietnam.

**Keywords:** Breast Cancer • Mastectomy • Breast reconstruction • Seroma • Flap • Treatment • Flap Necrosis

## Introduction

Breast reconstruction after a mastectomy is a necessity for many breast cancer patients, especially young women, especially when socioeconomic conditions develop, this need becomes even more urgent. needed to improve the quality of life of patients after cancer treatment. Currently, in the world, there are two popular methods of breast reconstruction: using implants and autologous flaps. Although breast reconstruction with implants is the preferred and increasingly popular method in the world, especially in early breast cancers, autologous breast reconstruction is increasingly asserting its sustainability compared to implants. There are many complications with implants, especially in the context of Breast Implant-Associated Lymphoma (BIA-ALCL), which is increasing after decades of follow-up in European and American countries. Since its introduction by Hartrampf et al. in 1982, the Pedicled Transverse Rectus Abdominis (TRAM) has provided a mass of tissue of a size and shape that is quite consistent with that of the contralateral breast. Therefore, the pedicled TRAM flap has become an important choice in breast reconstruction surgery with autologous materials, achieving superior results in terms of aesthetics.

For more than 30 years, the world has conducted parallel methods of breast reconstruction with autologous flaps by pedicled TRAM, free TRAM flap, and Deep Inferior Epigastric Perforator (DIEP) flap. The literature review of the works published in Pubmed, EMBASE, Scopus, and Cochrane data from January 1990 to January 2017 up to now, the summaries of comparative studies of these two methods show that no procedure would be superior to the other. Oncology Center-Hue Central Hospital started breast reconstruction with a Large Latissimus Dorsi flap (LDF) in 1998 and TRAM since 2007. To ensure the safety of the flap with good blood supply. The focus started with double-pedicled reconstruction, then improved to a single-pedicled with enhanced anastomosis in 2009 (Supercharged TRAM technique), and now

a single-pedicled. TRAM flap breast reconstruction has become a routine surgery for patients with early breast cancer.

## Objectives of The Study

Understanding some factors affecting the results of breast reconstruction with pedicled TRAM flap in early breast cancer patients.

## Research subjects

From January 2017 to June 2019, 41 patients underwent breast reconstruction surgery with TRAM flaps at the Oncology Center-Hue Central Hospital. Each patient was consulted about the TRAM flap with pedicle, flap, or implant and discussed with the physician in deciding the choice of reconstruction method. Breast reconstruction by TRAM flap with ipsilateral pedicle has 11 patients and contralateral pedicle TRAM flap has 30 patients, there are 14 cases where breast reconstruction was performed immediately after Nipple Sparing Mastectomy (NSM).

Main criteria for patient selection:

- Age: under 60.
- Patients with immediate breast reconstruction for stages I, and II.
- Patients with delayed breast reconstruction for stages I, II, and IIIA after 1 year of treatment.
- Good health and no uncontrolled chronic diseases such as cardiovascular disease, diabetes, chronic obstructive pulmonary syndrome.
- No smoking.

## Methods

As a prospective descriptive method, the portion of the flap is drawn according to a standard ellipse. The side that took the flap was based on the history of previous abdominal surgery. Create a tunnel under the skin from the flap-taking area to the place receiving the flap, that is, the location of the breast to be reconstructed. The tunnel is created with a width just enough to allow the flap to pass, but not too wide because it is easy to cause the flap to fall back and affect the aesthetic result. After inserting the flap through the tunnel, make sure the pedicle is not twisted too much. The breast is reconstructed according to the condition of the opposite breast to achieve symmetry.

## Results and Discussion

The reason for choosing TRAM flap as a breast reconstruction method for breast cancer patients

Literature review of works published in Pubmed, EMBASE, Scopus, and Cochrane data from January 1990 to January 2017. 11 studies are comparing pedicled TRAM flap and free TRAM flap, DIEP flap. The studies that evaluated 3968 flaps included 1891 pedicled flaps, 866 free flaps, and 1211 DIEP flaps. Patients with free flaps had a significantly lower risk of fat necrosis and partial flap necrosis compared with pedicled TRAM flaps, with no difference for complete flap necrosis and herniation or bulging of the wall. abdomen between the free TRAM flap and the pedicled TRAM flap. There were no significant differences in complications between pedicled flaps and free flaps except for hernia and abdominal wall bulging. The conclusions of these studies suggest that although the pedicled TRAM flap is being replaced by the free TRAM flap or the DIEP flap and it presents with lower complications related to flap necrosis and regional complications. However, in the literature over the past 20 years, there is still no clear evidence as to which flap has the most benefit with flap perfusion and regional damage to the flap. Therefore, surgeons should choose appropriate options based on patient wishes and patient-related factors (Figure 1).

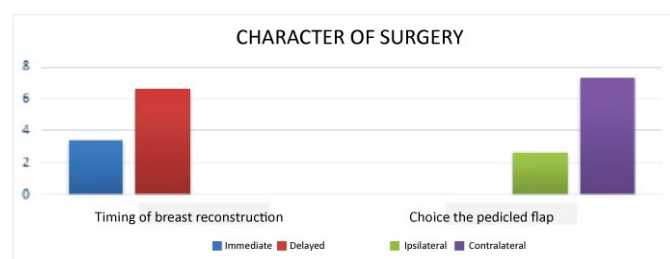
Another large study comparing pedicled TRAM flaps and free TRAM flaps were also published in the United States. The aim is to compare postoperative complications, hospital stay, and total costs of these two techniques. The study was conducted nationwide in the period 2008-2011 on 21,655 patients [1]. Through multivariate analysis, it was found that the free flap

had a higher rate of obesity, undergoing reoperation, requiring hemostasis surgery, hematoma complications, and infection compared with pedicle flaps. TRAM flap with pedicle is likely to appear pneumonia, or pulmonary embolism. Reconstructive forms did not affect the risk of flap necrosis or fluid accumulation. The total cost for free flap TRAM is higher than for pedicled TRAM, hospital stay is not affected by these two techniques. In a risk-adjusted multivariate analysis, a free TRAM flap was an independent risk factor for increased length of hospital stay, total out-of-pocket costs, and postoperative complications. The study concluded that the free TRAM flap increased the risk of postoperative complications and was more financially costlier than the pedicle flap in a large risk-adjusted analysis (Tables 1-4 and Figures 2 and 3).

**Table 1.** General characteristics of the study patients.

Features	N	Ratio %
<b>Body mass index</b>		
BMI ≤ 25	39	95.1 %
BMI > 25	2	4.9 %
<b>Personal history</b>		
Not menopausal yet	18	43.9 %
Menopause	23	56.1 %
<b>Co-ordinated Disease</b>		
Diabetes	2	4.9 %
Hypertension	0	0 %
<b>Old surgical scar on abdomen</b>		
Caesarean section scar	20	48.8%
Scar in the middle of the abdomen	1	2.4%
<b>Smoke</b>	0	0 %
<b>Family history</b>		
Breast cancer	0	0 %
Other cancer	0	0%

Comment: More than 50% of patients have old surgical scars in the abdomen, mainly by cesarean section



**Figure 1.** Timing and method of breast reconstruction surgery.

**Table 2.** Surgery time and postoperative care.

	N	%
<b>Time to take skin flap of rectus abdominis</b>		
<60 minutes	16	39%
60-90 minutes	25	61%
90 -120 minutes	0	0%
>120 minutes	0	0%
Total	41	100%
<b>Total time of surgery</b>		
<150 minutes	0	0%
150-180 minutes	2	4.9%
180-210 minutes	25	61%
210-240 minutes	2	4.9%

>240 minutes	12	29.3%
Total	41	100%
<b>Post-operative time</b>		
<10 days	3	7.3%
10-15 days	35	85.4%
15-20 days	1	2.4%
20-25 days	0	0%
>25 days	2	4.9%
Total	41	100%

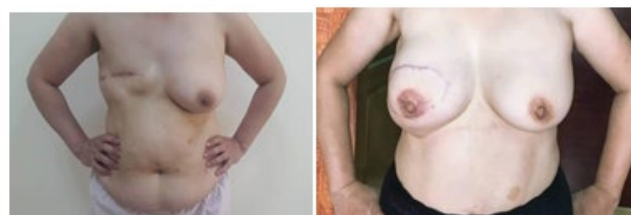
**Table 3.** Post-operative complications at the flap donor and recipient sites.

	N	Ratio %
<b>Abdominal incision podium</b>	1	2.4%
<b>Abdominal fluid collection</b>	2	4.9%
<b>Breast Reconstruction</b>	1	2.4%
<b>Partial flap necrosis</b>	2	4.8%
<b>Complete flap necrosis</b>	0	0%
<b>Abdominal swelling</b>	0	0%
<b>Abdominal hernia</b>	0	0%
Total	6	14.6%

**Table 4.** Comparison of patient characteristics with complication rate.

		N	%	P
<b>Age</b>	<45	2/17	10.5	0.084
	≥45	4/22	18.2	
<b>BMI</b>	<25	6/39	15.4	0.548
	≥25	0/2	0	
<b>Comorbidities</b>	Have	2	100	0.013
	No	4/35	11.4	
<b>Location</b>	Ipsilateral side	0/11	0	0.268
	Opposite side	6.24	20	

Comment: Age under 45, BMI<25, selection of ipsilateral flap stem, and no chronic disease are safety factors for breast reconstruction



**Figure 2.** Delayed breast reconstruction with TRAM flap and nipple reconstruction after 6 months, before and after surgery.



**Figure 3.** Nipple Sparing Mastectomy and immediate breast reconstruction with TRAM flap, before and after surgery.

Complications in pedicled TRAM flap breast reconstruction in Vietnamese women are acceptable compared with other authors in the world

When comparing complication rates of TRAM flaps with pedicle and DIEP

flaps, many studies show that the overall complication rates of flaps are similar between the two groups, while TRAM flaps with abdominal wall bulging complications are higher (9, 5% vs. 2.3%), hernia rate is 3.9% vs. 0%. Patients with DIEP flap reconstruction had a higher satisfaction rate (81.7% vs 70.2%), but the level of cosmetic satisfaction was similar between the two groups [2, 3]. In our study, there were 6 general complications of the surgery, accounting for 14.6%. When compared with some other authors, complication rates are shown in Tables 5 and 6.

**Table 5.** General characteristics of the study patients.

Research	Number of complications	Ratio %
Adeyiza O. Momoh(n=197)	55	27.9%
Yoon S. Chun (n=105)	49	46.6%
Patricia A. Clugston (n=190)	97	51.3%
NDTung (n=41)	06	16.4%

**Table 6.** Complications at the flap receiving site.

Symptoms	Adeyiza O. Momoh(n=197)	Yoon S. Chun (n=105)	Patricia A. Clugston(n=190)	NDTung (n=41)
Complete flap necrosis	0 (0%)	0(0%)	0(0%)	0(0%)
Partial flap necrosis	3 (1.5%)	-	5(2%)	2(4.8%)
Partial fat necrosis	-	24 (11.4%)	18(7.1%)	0(0%)
Complete fat necrosis	23 ( 11.7%)	-	-	0(0%)
Infection	5 ( 2.5%)	4(3.8%)	7(3.7%)	0(0%)
Breast hematoma	7 (3.6%)	2(1.9%)	3(1.6%)	1(2.4%)

Complications at the flap receiving site vary from author to author. In this study, our complication rate is almost equivalent to the studies of Adeyiza O. Momoh, Yoon S. Chun, Patricia A. Clugston. Our study did not record any cases of partial and complete fat necrosis. There was 1 case of breast hematoma that was evaluated under ultrasound and performed drainage in the operating room. In particular, there were 02 cases of flap necrosis, accounting for 4.8%, in the case of partial flap necrosis, the necrotic flap tissue was removed, and after the removal, the remaining flap tissue was assessed to be well perfused, so we decided to plan to stitch new breast reconstruction (Table 7).

**Table 7.** Complications at the flap receiving site.

Symptoms	Adeyiza O. Momoh(n=197)	Yoon S. Chun(n=105)	Patricia Clugston (n=190)	NDTung (n=41)
Abdominal hernia	7(3.9%)	3(2.9%)	0(0%)	0(0%)

Abdominal swelling	17(9.5%)	3(2.9%)	11(5.8%)	0(0%)
Infection	-	2(1.9%)	-	0(0%)
Abdominal wall hematoma	-	1(0.9%)	3(1.6%)	2(4.9%)
Lymphatic cysts	-	4(3.8%)	18(9.5%)	0(0%)
Abdominal incision podium	-	4(3.8%)	20(10.5%)	1(2.4%)

Our study shows that the rate of complications at the flap site is lower than the studies of other authors. Complications of most concerns in the abdominal wall are hernias and bulging of the abdominal wall. In our study, there were not any cases of complications mentioned above. According to Patricia A. Clugston, there is a close relationship between the rate of complications in the abdominal wall and the method of abdominal wall reconstruction using mesh or not. Complications are increased in cases of abdominal wall reconstruction without the use of mesh panels. In our study, 100% of patients with abdominal wall reconstruction used mesh panels [4, 5].

## Conclusion

Evaluation of early research results within 2 years 2017-2019 on 41 early breast cancer patients undergoing breast reconstruction surgery with TRAM flap at Hue Central Hospital showed that clinical factors can bring positive results. The safety for this surgery to minimize the complications is age under 45, BMI<25, no chronic comorbidities, use of ipsilateral vascular pedicle, and abdominal wall reconstruction mesh. Breast reconstruction surgery with a pedicled TRAM flap on Vietnamese women has a lower complication rate than other authors in the world and is the choice for patients with early breast cancer.

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