

Original Research Article

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Pedicled transverse rectus abdominis myocutaneous flap breast reconstruction: Hospital Kuala Lumpur's early experience

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ABSTRACT

Background: Breast reconstruction is traditionally performed by the plastic surgeons. In the last four years, we have embarked on autologous breast reconstruction. We conducted a retrospective study to evaluate the complications and cosmetic outcomes of a pedicled transverse rectus abdominis myo-cutaneous (TRAM) flap breast reconstruction.

Methods: We enrolled forty-one patients who underwent a TRAM flap reconstructive surgery between January 2016 and January 2020 at the hospital Kuala Lumpur, Malaysia. Thorough retrospective reviews of medical records were performed. Patient's satisfaction on the cosmetic outcome were assessed with the breast-Q questionnaire.

Results: Forty-one patients with a mean age of forty-six years old, had ipsilateral pedicled TRAM breast reconstructions for various breast pathologies including invasive carcinoma (n=31, 75.6%), ductal carcinoma in situ (n=8, 19.5%) and phylloides tumor (n=2, 4.9%). Immediate reconstruction was performed in thirty-nine patients and delayed reconstruction in two patients. Based on The American joint committee on cancer (AJCC) TNM system, the pathologic stages among those patients with breast cancer were 0 (n=8, 20.5%), I (n=3, 7.69%), II (n=9, 23.1%), III (n=18, 46.1%), and IV (n=1, 2.56%). During the mean follow-up of seventeen months, flap and donor site complications were reported in twelve patients (29.3%) and five patients (12.1%) respectively. Nineteen were very satisfied and sixteen were satisfied.

Conclusions: Breast reconstruction with a TRAM flap can be safely performed by the oncoplastic breast surgeons with good aesthetic outcomes.

Keywords: Pedicled TRAM flap, Autologous breast reconstruction, Post-operative complications, Cosmetic outcome

INTRODUCTION

A pedicled transverse rectus abdominis myocutaneous (TRAM) flap breast reconstruction is the most popular technique for autologous reconstruction which was first introduced by Hartrampf et al in 1982.¹ Since then, breast reconstruction using a TRAM flap has been widely performed with good aesthetic outcomes.^{2,3}

In our center, breast reconstruction was traditionally performed by the plastic surgeons. However, in the last four years, we have embarked on autologous and implant-

based breast reconstructive surgery which generally performed by our trained oncoplastic breast surgeons. The pedicled TRAM flap reconstruction is the commonest reconstruction performed in our center.

Therefore, we conducted a retrospective study to evaluate the effectiveness of breast surgeons performing a pedicled TRAM flap breast reconstruction based on the complication rates and cosmetic outcomes. We also reviewed on patients' satisfaction of their reconstructed breasts.

METHODS

We performed a retrospective study involving forty-one consecutive patients with various breast pathologies who underwent a pedicled TRAM flap breast reconstructive surgery between January 2016 and January 2020 in the hospital Kuala Lumpur, Malaysia. This study was reviewed and approved by the ethics committees of Hospital Kuala Lumpur, Malaysia (research ID 60777). An autologous breast reconstruction was offered to all patients who had to undergo mastectomy or had previous mastectomy. However, patients with diabetes, multiple comorbidities, previous midline laparotomy or active smoking were excluded.

The surgeries were performed by two trained oncoplastic breast surgeons. Both surgeons adhered to the same surgical technique and routinely harvested an ipsilateral flap. The key steps of the technique are as follows. The flap was designed in the lower abdomen in an elliptical form. The upper and lower abdominal incisions made and deepened till the external oblique aponeurosis. The upper abdominal flap was subsequently raised from the aponeurosis until the costal margins. A tunnel connecting the abdominal and mastectomy sites was subsequently created. The flap harvested by dissecting from the aponeurosis from lateral to medial. The anterior rectus sheath incised vertically exposing the edges of the underlying rectus muscle. The inferior epigastric vessels along the lateral edge of the rectus muscle were ligated and divided. The distal part of the anterior rectus sheath and rectus muscle were divided allowing the rectus muscle together with the attached flap to be elevated off from the posterior rectus fascia. The flap was then delivered to the mastectomy site. The zone IV of the flap was routinely discarded and the remaining of the flap shaped into a breast mound. The defect on the anterior rectus fascia repaired using the polypropylene meshes. Following the abdominal wound closure, the new umbilicus created at the midline approximately five cm above the abdominal wound.

Thorough reviews of the medical records, the patients' demographic data, tumor characteristics, operative details, and post-operative complications were recorded. During the follow-up, patients were consulted about the study and an informed consent obtained to those agreed to participate. Subsequently, patient's satisfaction on the cosmetic outcome were analyzed using the breast-Q questionnaire. All statistical analyses were performed using the IBM statistical package for the social sciences (SPSS) statistic version 26. Continuous variables were summarized as mean and range. Categorical variables were summarized as counts and percentage.

RESULTS

During the study period, forty-one patients with a mean age of forty-six years old (range: 37–65) had unilateral ipsilateral pedicled TRAM breast reconstruction for various breast pathologies including invasive carcinoma

(n=31, 75.6%), ductal carcinoma in situ (n=8, 19.5%) and phylloides tumor (n=2, 4.9%). Based on the American joint committee on cancer (AJCC) TNM system, the pathologic stages among those patients with breast cancer were 0 (n=8, 20.5%), I (n=3, 7.69%), II (n=9, 23.1%), III (n=18, 46.1%), and IV (n=1, 2.56%). Immediate reconstruction was performed in thirty-nine patients and delayed reconstruction in two patients. Two patients with a previous history of mastectomy for breast cancer had delayed reconstruction. Contralateral breast reduction mammoplasty was performed in three patients with large ptotic breasts. Approximately, 63.2% of the cases required systemic therapy either neoadjuvant or adjuvant chemotherapy followed by adjuvant radiotherapy (Table 1).

Table 1: Patient demographics.

Parameters	Mean (range), number (percentage)
Number	41
Age (years)	46 (37–65)
Breast pathologies	
IDC*	31(75.6)
DCIS**	8 (19.5)
Phylloides	2 (4.9)
AJCC stage	
0	8 (21.1)
I	3 (7.69)
II	9 (23.1)
III	18 (46.1)
IV	1 (2.56)
Timing of reconstruction	
Immediate	37 (94.8)
Delay	2 (5.4)
Operative time (hours)	4 (4–5)
Chemotherapy	
Adjuvant chemotherapy	15 (38.5)
Neoadjuvant chemotherapy	9 (23.1)
Radiotherapy	
Yes	24 (61.5)
No	14 (38.5)
Duration of follow-up (months)	17 (range: 14–60)

During the period of follow-up with a mean of seventeen months (range: 14–60), flap site complications were reported in twelve patients (29.3%) where fat necrosis was the commonest complication (Table 2). Nine patients developed fat necrosis involving small portions of the flap (<5% of surface area). Two patients post delay reconstruction had partial flap necrosis, which required surgical debridement and one had superficial surgical site infection (SSI). Donor site complication reported in five patients: four patients with SSI and one patient with abdominal hernia. With these complications, the rate of donor site complication is 12.1% (Table 2).

Table 2: Complication rate.

Complication	Number (percentage)
Flap site complications	
Fat necrosis	9 (22)
Partial flap necrosis	2 (4.9)
Total flap necrosis	0
Infection	1 (2.43)
Hematoma	0
Seroma	0
Total number of flap complications	12 (29.3)
Donor site complications	
Abdominal infection	4 (9.8)
Abdominal hematoma	0
Abdominal seroma	0
Abdominal bulge	1 (2.3)
Umbilical ischaemia	0
Total number of donor complications	5 (12.1)

Patient's satisfaction on the final cosmesis was assessed using a standard breast-Q questionnaire. Thirty-five patients responded to the questionnaire; nineteen were very satisfied and sixteen were satisfied (Table 3). None of our patients with the reconstruction reported any dissatisfaction.

Table 3: Patient' satisfaction on the cosmesis.

Satisfaction grade	Number (percentage)
Very satisfied	19 (54.3)
Satisfied	16 (45.7)
Dissatisfied	0
Very dissatisfied	0

DISCUSSION

Breast cancer is the most common cancer among Malaysian women accounting for 24.1% of all cancers and 47.9% of these women diagnosed at the late stages either stage III or IV.⁴ Majority of these women will be then subjected to mastectomy with or without breast reconstruction. Traditionally, breast reconstructive surgery was performed by the plastic surgeons. In the last four years, our unit has embarked into a breast reconstructive surgery. Women that are suitable for reconstructive surgery will be given options for either autologous or implant-based reconstruction. However, implant-based reconstruction was less popular among our patients due to the cost and the risk of developing contracture due to the post-mastectomy radiotherapy (PMRT).

Although, a significant amount of medical expenses is subsidized by the government, women who wish to undergo an implant-based reconstructive surgery must bear the cost of an implant which ranges from RM 2300 to

3000 (USD 554–722) depending on the types and brands of the implants. The cost is even higher in a bilateral or two-stage implant-based reconstructive surgeries. Since majority of our patients with late stages of breast cancer required PMRT, the risk of capsular contracture was inevitable. A meta-analysis analysis reported women with a PMRT have ten times the risk of developing capsular contracture than those without PMRT.⁵ This study also reported a significant increase in numbers of implant failure requiring revision surgery and reduction in satisfaction rates among patients undergoing PMRT.²

Therefore, an autologous reconstruction either pedicle TRAM or latissimus dorsi (LD) flap was a preferred choice of breast reconstruction among our patients. In our series, there were thirty-seven cases of breast cancer who underwent immediate TRAM flap reconstructions following a mastectomy. Almost half of these cases were late-stages including one case with a stage-4 cancer. Although, the standard of treatment of a stage-4 cancer is palliative chemotherapy prior to any surgical intervention. However, in this case, the surgery was performed prior to the chemotherapy since we did not anticipate clinically any distant metastasis. Furthermore, the imaging staging was performed after the surgery, due to constraints in our hospital setup.

To assess the effectiveness of TRAM flap reconstruction, there are several important parameters that can be used which include rate of complications, operative time, length of hospital stays, time to return to work and patient's satisfaction.⁶ In this study, we focused on the complication rates and patient's satisfaction on the cosmetic outcome. The rate of flap complications reported in few studies varies from 23.2-43.5%.⁷⁻¹⁰ In this study, the flap complication rate was 29.3% with fat necrosis was reported as the commonest complication (n=9, 22%). This might be attributed to the high percentage of our patients (63.2%) received an adjuvant radiotherapy. Although active smoking and extensive use of a flap including zone IV are other established risk factors, they are unlikely to be the contributing factors in our patients. This is because we have excluded active smokers and routinely discard the zone IV. In a small breast, we even resect out the distal part or entire of zone II leaving the remaining tissue from zone 1 and III to be used in the reconstruction.

The other major complication is flap necrosis which can be either partial or total flap necrosis. Total flap necrosis is rarely occurred accounting for only 1% or less.¹⁰ For partial flap necrosis, the reported rate varies from 9.8 to 14%.^{8,9} In our series, we have no total flap necrosis. Partial flap necrosis was documented in the two cases of delayed reconstruction (5%). This might be due to the previous chest wall radiation leading to impair vascularity of the flap and eventually, necrosis since we always harvest the ipsilateral pedicle flap. For donor site complications, the documented rate was 12.1% which is similar than those of previous reports.^{8,9} With a low rate of complications, we managed to achieve good outcomes in majority of our

patients. We conducted a survey on cosmetic outcomes with thirty-five patients; nineteen patients were very satisfied and sixteen were satisfied. Figure 1 showed a patient who very satisfied with cosmetic outcome with this procedure. This case series was rather small with some limitations, and it was a single institution study so much so a definitive conclusion could not be made. However, the results so far were encouraging and comparable with findings found in other studies and centers.



Figure 1: A 48-year-old-female with left breast cancer, T3N1M0 underwent immediate TRAM flap reconstruction after simple mastectomy with axillary clearance.

CONCLUSION

In the hands of trained oncoplastic breast surgeons, breast reconstruction with a pedicled TRAM flap can be performed safely with reasonable complication rates and good aesthetic outcomes.

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